RELEASE 1.0

3-98 | ESTHER DYSON'S MONTHLY REPORT | 23 MARCH 1998

LET'S BE CLEAR:
YOUR OPERA GLASSES FOR THE 1998 PC FORUM
by Esther Dyson and Jerry Michalski

What rules and structures should govern the Net? That question is increas-ingly occupying both governments and private actors on the Net. If you believe as we do that the necessary rules and structures will emerge spon-tan-eously, then you are duty-bound to show how and to provide evi-dence that it is happening. That is the underlying purpose of this year's Forum. What affordances do we need and are we developing in order to make the Net grow as a safe and healthy place for business, community and indi-viduals?

The idea is stated in short form as "The Net can govern itself, thank you." But it is more complex than that. The basic idea is that people, companies and yes, even governments, on the Net and off, will interact to create rules, organizations and norms that will enable the Net to become mostly a healthy, productive place. That does not mean that we should all be passive and let it happen. It means that we are part of the process and we have the right and even the obligation to do our share. The presence of others doing the same will offset over time the mistakes or even intentional damage of those who are greedy, malicious or power-hungry.

This is a highly optimistic view, and it won't be realized in full. Nonetheless, the game is worth the effort.

To make it all work, the most important "rule of nature" is robust feedback loops: The results of actions need to feed back to the actors. Neither evolu-tion nor markets can work if the units don't feel the consequences of their capabilities and behavior.

On the Net, this means that the players must normally be identifiable and vi-si-ble, both as individuals and as types, so that interactions among them can produce the miracles of emergent structure: diversity, evolution, alloca-tion of resources (markets and =====>

WELCOME TO TUCSON!

INSIDE

LET'S BE CLEAR 1
Introduction.
IDENTITY AND TRUST 4
Holland, Brill, Cook.
EXOGENOUS INFLUENCE 7
Barrett.
SECRETS EXPOSED 8
Palmer, Grouf, Levy, Morgan.
WHO OWNS THE INFRASTRUCTURE? 13
Ness, Evslin, Sidgmore, Sirois.
SECRETS AND CERTIFICATES 17
Summers, Baker, Sclavos.
BRAND VS. EXPERIENCE 21
Berg, Heiferman, Minor.
IDENTITY AND IMMUNITY 25
Forrest.
NET RECONFIGURES BUSINESS 27
Barksdale, Dell, Moran, Sidhu.
ART OF MANAGING BOUNDARIES 32
Bohnett, Cashel, Johnson, Wallman.
LOOPS, LITERACY AND LEARNING 35
Laurel, Pea.
COMPANY PRESENTERS 39
KID'S ROOM 63
RESOURCES 67
Names, phones, URLs.

investment), communities of interest, commercial structures, and regulatory organizations with defined jurisdictions and constrained power. Organs of power — whether businesses, "voluntary" organizations or governments — must likewise operate transparently, and the motivations and interests of the people within them should be disclosed and discernible.

Accordingly, we have more participation from government here this year than ever before. Our goal is to have government people here not as visitors from another planet, but rather as just one more set of actors in the virtual ecosystem. In the world we're exploring, government is not all-powerful: It faces competition both from other governments and from other governing structures. These other players include "self-regulatory" and voluntary organizations, and commercial operations such as online services. All of them are trying to lure Net activities and Net players into their own jurisdictions, motivated by considerations both financial (read taxation) and cultural (read: resistance to US imperialism/hegemony). The question is not whether or how to constrain business or to constrain govern-ment per se, but how to design rules that avoid undue concentration of power.

Can disclosure do it all? Will empowered citizens and consumers be able to demand and exercise their rights against powerful organizations, or do they need to construct their own powerful organizations as counterbalances? Isn't that what government is supposed to be? At least in principle, at least in the US, government derives its powers from the consent of the governed rather than from some divine right. This may be why Americans overall have less trouble with concept of sui generis Net governance than do citizens and especially governments of other countries. And this is why, on the Net, we want to explore how to design systems and structures of governance that adhere to these principles.

We have loosely structured the Forum into three days, beginning with the scientific underpinnings on Monday, the practical infrastructure on Tuesday and the impact on Wednesday.

MONDAY: DIFFERENTIATION AND IDENTITY

Esther Dyson, EDventure Holdings: Let's be clear

In theory, the Net will foster a more open, more truthful marketplace both for commercial goods and services, and for ideas. But it will not do so without rules and institutions that govern the behavior of the individual agents. Sellers must be accountable for what they sell; publishers for what they publish; politicians for what they promise.

How? Laws cannot guarantee accountability, but laws that foster disclosure can move the power for accountability into the decentralized hands of the market — customers, viewers/watchers, citizens and voters. Moreover, that decentralized market does foster the emergence of institutions that force accountability. Witness the emergence of *Content Magazine* (below), of the US government and its many laws, of Intuit and its ratings, of AOL and its terms of service and policies for choosing the companies who may advertise on its site. (These structures are not always perfect.)

On the Net, will we persist in our almost-religious distinction between companies and governments? The basic difference is choice versus coercion: Countries have a geographical monopoly, whereas companies at least in principle must compete for their adherents. But in the world of the Net, that is being reversed. Governments must compete with other organizations of governance, while some companies may become Net monopolies. Or at least so some fear.

Can we trust emergence, or how should we guide the market's hand, understanding that we are only agents in the system ourselves? At what level are we looking? Are we within a larger system, or can we impose better rules on the existing systems from outside?

John Holland, Santa Fe Institute: Meta-man

"What would deregulation mean in a developing metazoan?"

That's the kind of question that intrigues John Holland, a scientist we have long admired for his character as well as his mind. Formally professor of computer science & engineering and of psychology at the University of Michigan, as well as a trustee, external professor, and co-chairman of the science board at the Santa Fe Institute, he is best-known for the concept of genetic algorithms, which he formulated in the early 60s. (See Holland's 1975 book, **Adaptation in Natural and Artificial Systems**, and also **Release 1.0**, 4-92. Basically, this is the notion that you can evolve code through sexual-style recombination of components and mutations.) His own mind is a model of fertility — or of "emergence," the way in which interacting agents cause complex structures to emerge spontaneously.

Holland leads off the Forum by exploring how complex structures emerge from the interactions of independent units, whether people, commercial organizations, chess pieces or software agents. He describes this phenomenon in his new book, **Emergence: From Chaos to Order.** At the Forum, he also considers how it might apply to social organizations — or even the Net.

The first-order effects are that certain organisms live or die. But over many cycles, the organisms themselves become more complex, and eventually they may even combine into complex groups or structures, such as new species or cooperating groups. Holland will talk about how this happens with the relatively simple organisms he models on computers, and will stick around to help us figure out how this applies to the more complex agents and environments that constitute digital society.

Holland has gone well beyond the basic concepts of emergence while most of us are still trying to understand them. The original miracle, he says, is that "you start out with one fertilized egg, and after a thousand generations you get all these other cells of different kinds, and they know where to go. They develop their own boundaries: In a large organism, for example, it doesn't do to have kidney cells all over your body."

He is particularly intrigued by the notions of induction and competence: "Induction is...call it 'neighboring effects,' how cells influence those around them. For example, a cell that's going to become a nerve cell forces cells around itself into a path that they might not take otherwise.

So the incipient nerve cell may induce its neighboring cells to become glial cells (providing metabolic support), or it may induce other nearby incipient nerve cells to connect to it, forming ganglia. In fact, by being A, a cell can force its neighbor into becoming B."

Show your competence

The opposite of induction is called (in this branch of science) competence — the ability to resist induction. "When neighbors fail in competence," Holland notes, "you get cancer because the cancerous cell becomes competent to ignore the controlling signals (induction) from neighboring cells — signals that normally keep it and its many children from runaway reproduction." So, for example, you could get a dictator who forces everyone to obey, a group of skinheads or mafia that controls a neighborhood, or the Stepford Wives.

But Holland is leery of cheap analogies. "There has been a rash of stuff recently," he notes, "about this idea that planning is no longer possible so you just have to go with the flow. But as human beings we can still make choices. We're part of a bigger system, but an active part. After all, if not us, then who?"

Order does not emerge spontaneously from chaos. The rules you define control what happens overall. Although you cannot design a community or an organism, you can design the rules that foster its development. And you can certainly apply some learning as well as evolution to improve society. While evolution may work its magic over generations, after all, society operates on a faster time scale.

The question of how all this works intersects with issues of time and scale: how a reputation builds up over time, the size of a community, the level at which you set the boundary between inside and outside. Is a company a collection of profit and loss units, or a unified structure? Where should hierarchy rule, as in, say, McDonald's, and where should units be self-organizing, as in a holding company?

PANEL: IDENTITY AND TRUST

As Holland explains, identity is what separates you from the outside world and what separates you from each other individual. Identities are established through interaction, determined by external signs and behavior — what each agent shows and what each agent does. Those same interactions result in increasingly complex social/political/economic systems. Identity depends on co-evolution with outside forces and agents. Evolution, like markets, ideally produces the survival of many "fittest," causing them to diversify into niches in which they can rule. It fosters diversity rather than a single winner.

So how does all this apply in the world of people and companies? What does identity mean in a modern society? What are the rules of disclosure for private individuals, public individuals, businesses? What happens when people know all? Do we become more forgiving of everyone's flaws? As high-lighted by the recent scandals in Washington, how should law and public opinion interact? Can disclosure replace regulation?

While governments have rules and organizations such as Intuit will have terms of service and criteria and guarantees, the press as an institution is characterized by a lack of rules (as opposed to traditions and norms). Its only regulator is the market and to some small extent public opinion about what is and is not acceptable content. The real question is whether the public will continue to exercise its own market power to foster a press that focuses on the truth, or whether it will wimp out and leave us with media that focus only on entertainment (and capturing eyeballs for advertisers).

Steven Brill, Brill Media Ventures: Yale man

Steve Brill, ceo of Brill Media Ventures, aims to be one of the players in that market of customers demanding truth rather than heat. Brill paid his way through Yale College and Yale Law School by working as an assistant to Mayor John Lindsay of New York and writing for *New York Magazine*, *Esquire* and *Harper's*. He also wrote a best-selling book called **The Teamsters;** not everyone liked it, and his publisher Simon & Schuster temporarily hired bodyguards for Brill and his wife. He did all this from 1970 to 1976, while earning a BA and a law degree. (He graduated, but didn't inhale?)

In 1978, he founded *The American Lawyer* magazine, known for getting behind the legal community's official story and digging up everything from law firms' revenues to real dirt such as innocent people on death row and the story behind Ariel Sharon's libel suit against *Time Magazine*. Question: Was he turning on his own community, or forcing it to become better through disclosure? In 1991, he took the message to a broader public with Court TV. He has now sold this empire back to his partners at Time-Warner for an undisclosed sum (which he would gladly reveal if he were running for office or raising money from the public, right?).

Having thoroughly disrupted the legal community, Brill is ready to do the same for the world of journalism with a new magazine, *Content*. [Dis-clos-ure: Esther has rashly agreed to write a monthly column for this ..magazine.]

Even, or perhaps especially, in the world of the press, he believes that the issue is branding. With *Content*, he wants to foster a "market for trust in addition to demographics" in the advertising world. Huh? The notion is to rate publications and Websites not just for eyeballs but for credibility.

He continues, "I have this theory.... I think that the marketplace is going to correct journalism. The reason the *Wall Street Journal* — as opposed to Dow Jones — is worth money is that it has a brand name that represents reliability. If it doesn't keep that, it's going to be in trouble. I want to use this magazine to rate the credibility of media. The only measure Madison Avenue regularly uses is how many readers or occasionally their demographics. Instead, I want to figure out how to do credibility ratings. Even if we just report the scores in our magazine, it will become a very important economic measure.

"Let's face it: As consumers or businesspeople, we pay more attention to an ad in the New York Times than to one in the *New York Post*. If you have a

serious product you want it taken seriously.... It'll probably happen on the Web faster than anyplace else. There you have 2 million products. The way they're standing out now is by having a derivative brand name — NBC or CNN or *Time Magazine*.

"It almost has to happen," he asserts. "The only customer I really know well is me. Someone has to tell me when I log on what to believe or which one is corrupted by advertising. As a customer I want that. The Lewinsky thing brings that out in a different form. For me, David Broder is still a brand name; if David Broder says something, I believe it. A lot of what has happened in the Monica Lewinsky case has really hurt many journalists' brand names because we've seen them publish something and then retract it...or not retract it — just have it turn out to be wrong with no comment. It's the perfect time to start a magazine to help consumers and advertisers figure out what's the good stuff."

Will consumers really read this? we wondered. Isn't it something of a special interest? "Well, there's consumers and consumers," Brill responds. "*The New Yorker* is a consumer product. I'm not talking about the average person who watches the Jerry Springer show."

Scott Cook, Intuit: Customer's man

Another force for truth is what John Hagel, a speaker at last year's Forum, calls community Webs — organizations that aggregate resources and products in behalf of their members. Of course, there's the delicate issue that they're doing so for profit, but making a profit by benefiting your cus-tomers is an honorable tradition. Indeed, we were heartened recently to read in the *Wall Street Journal* that consumers en masse are refinancing their debts at lower rates, egged on by profit-minded lenders who are finally competing to get their business by offering them a better deal.

Chairman and co-founder Scott Cook is trying to build up such a role for Intuit, which is turning from a product company into an Internet content/ services company. Cook is fairly well known to our audience: Formerly a mild-mannered marketing man in charge of Crisco at Procter & Gamble, he founded Intuit around the insight that people don't want their bill-paying experience to be enriched; they want it **quickened**. From that start, Intuit has turned into a leading supplier of financial services to consumers and small businesses. It has their trust; where should it go from here?

Although Cook has not yet left Intuit like his co-founder Tom Proulx (a major force behind the overthrow of California's Proposition 211), he shows signs of a similar interest in issues political. At a recent dinner party, when guests were asked, "What is the greatest achievement of the second half of the 20th Century?" most came up with answers such as the microchip, penicillin, and of course the Internet itself. But Cook differed: "I think it's the moral victory of pluralism. We are taking power away from states; we're controlling businesses through networks instead of hierarchies; we're letting go!"

It used to be, he says, that data was all managed centrally, but now it has to be distributed — and given back: "Customers own the data, and they con-trol it. We have to get their permission. But we're not to the point of

where we're going, because we don't yet have the power to deliver really customized service."

What of the trade-off between freedom of choice and quality control as Intuit links its customers to a variety of providers of financial services? "Will you kick people off?" we asked. "Will you make the tough decisions — and take responsibility for them?"

Freedom of choice

"We don't actually certify anyone," Cook responds. "We're doing a lot to introduce customers to financial advisors, tax accountants and so on. But if you certify providers for anything, people will assume you're certifying them for everything, such as being hardworking and honest." He carries his beliefs in decentralization all the way down: Instead of "regulation, he says, "We'll have customer ratings. A new vendor won't get rated right away, and we'll have controls so that someone can't get his friends to do the ratings."

Consider, Cook adds, an auto insurer who handles people with "DUIs" — driving under the influence — convictions. That insurer may have a lousy rating from most people, and expensive rates, but it may be some people's only recourse. "Do we want him off the system? No. But we do want people to know what they're getting."

Cook argues that Intuit can serve both customer bases — advertisers and consumers — but that Intuit is well-placed to put the interests of consumers first: "It's all we've done until 18 months ago. In fact, the challenge was more to persuade our people why we have to take advertising, that we're not prostituting ourselves the moment we take advertising. Our problem has been the reverse. If we win with the customers, the financial institutions will be there."

Can Intuit really represent the best interests of its customers? Probably it will do so as long as there's always the threat of competition that will allow its employees' best instincts to win out.

Craig Barrett, Intel: Exogenous influence or guiding hand?

Intel's goal in this industry is very simple: Get people to use more power. While Intel has a few direct, controlling investments in areas such as video and e-commerce, the company has settled on a course that seems likely to produce better results even as it takes less work and arouses less sus-picion from those who fear the influence of Microsoft: Make lots of small investments, don't ask for control, and let the market do its work. Intel is "interfering" with the market by pouring energy into the ecosystem rather than as a guiding hand.

"The basic areas for now," says Craig Barrett are "rich content, developing the cpu architecture, and most of all, apps which require increasing power. You'll need to have end-users get involved in speech recognition, using video and digital imaging. We're trying to foster a change in their habits — e-commerce, remote training, security...." To do so, it has created a billion-dollar investment fund which has funded some of the industry's most

promising companies, including Marimba, NetObjects, Pandesic(TM), all kinds of wireless ventures, things that use up lots of bandwidth, and more. Most recently, it tried to encourage content providers to use graphics-heavy content that would look better with Intel processors — not a popular move in all quarters.

As an industry leader, Intel is one of the major forces in favor of freedom of encryption, without which many of these other things — notably e-commerce — cannot happen, Barrett believes. Intel and some friends (IBM, HP, Sun et al.) have just launched a broad-scale initiative in favor of encryption. "We lobby; we work on standards," says Barrett. The goal of Americans for Computer Privacy, for what it's worth, is not just lobbying, but trying to reach beyond Washington to the people who vote for the legislators. Along with many other crypto activists, Barrett has had the experience of sitting with a legislator who says in effect, "I agree with you, but I just can't vote for this. I see your point of view but I can't support it. I'd lose my seat, and then how could I help you?" The only answer is — surprise — transparency and clarity in the minds of a better-educated public, the people who actually vote for the legislators.

INTErnationaL

Barrett also has an international point of view that's still unusual in this industry. Perhaps it's due to the fact that so many ceos have little international experience, since they started their companies and spent most of their time at headquarters. Barrett, by contrast, spends 15 to 20 percent of his time outside the US, including 5 to 6 weeks a year in emerging markets. "People enamored of the US are looking at an increasingly smaller fraction of the business," he says. "If computer sales in Circuit City go down 1 percent, they have a heart attack, but it's growing in China. In lots of markets, local companies outsell the multinationals; they're bringing the latest technology in faster. Legend and Great Wall (PRC), HCL (India), Vist (Russia), Optimus (Poland).....all they can compete with is technology, so they use it to the hilt." He also sees huge potential in the markets of Latin America, and in Costa Rica, which will never be a huge market, but will serve as the home of a new $500-million manufacturing plant.

Craig Barrett is now in line to succeed Andy Grove, and as such he plays an important role in shaping the industry's future. It learned something from its early experiences on the Net, when a flaw in the Pentium(R) processor was discovered by a math professor who posted the news on the Net. At first Intel ignored the story, promulgating its own "official version" through its PR machine. But the Net won out: Intel acknowledged its errors and spent $475 million to replace flawed chips.

PANEL: SECRETS EXPOSED; TRANSPARENT WALLS

The Net's increased connectivity exposes far more information than ever before, intentionally and not. Many companies are deeply linked to each other to outsource functions, design products or share problem-resolution data. But doing so can not only expose weaknesses to other companies, it can also leave doors ajar through which determined outsiders can break in and read sensitive information.

The Net also helps companies collect an impressive array of personal information on customers and visitors. How much do data miners and aggre-gators really know about us? How intimate should companies get with their customers? Who owns that information? Where should that information be kept, given the conflicting needs of efficiency, privacy and competitive pressures? What are Web users really doing, anyway?

Charles Palmer, IBM Research: What ethical hackers know

Charles Palmer has a fun, serious job. He runs IBM Research's Global Security Analysis Lab — the company's "ethical hacking" team. Companies hire his team to try to break into or otherwise disrupt their own computer networks. About 80 percent of the time, Palmer's team succeeds. As you might imagine, this can cause quite a ruckus.

Palmer, a native of Louisiana who joined IBM in 1984 after six years at Amoco, founded the Lab in 1995. The Lab conducts computer and network security research, develops network security analysis and intrusion-detection tools, identifies new vulnerabilities and works closely with IBM's security consulting practice and its emergency response service. The Lab has had over 100 clients, some overseas, from a wide range of industries, including international financial institutions, ISPs and Web hosting serices.

There are many kinds of attacks. One of the simplest and most devastating is the denial-of-service attack, which floods a company's site with so many access or service requests that it is effectively unavailable for its intended clients. Another attack entails gaining access to read from or write to file servers on a corporation's Website or inside its firewalls. This is how Website contents get rearranged and how confidential files are broken into or servers are shut down. A third, relatively simple, attack is to break in deep enough to send a fake message from the ceo. Doesn't that sound like fun?

When a project starts, Palmer asks the client executive not to tell anyone about the upcoming attack. That way, the client gets a true evaluation of the site's vulnerability. At the end of a project, the Security Analysis Lab creates a report for its client detailing its weaknesses and preventive measures it should take.

Put your hands up and step away from that keyboard!

To do all this without landing his crew in prison or bringing the client company to its knees, Palmer obtains a signed "get out of jail free" card from the client, defining the rules of engagement for the security evaluation. The card includes the name and contact information for the cio or other manager who is likely to be contacted when the attack is detected.

During the company presentations on Monday and Tuesday afternoon, Palmer's team will attack several of the Forum attendees' companies (with their advance permission, of course). In order to protect the identities of the hacking squad's members and preserve their targets' anonymity, Palmer's team will remain in its secure facility in Westchester County, NY. While his crew lays siege, Palmer will give a short masters class on what's going on. There's no guarantee of success for the attack, but you're sure to

learn some things that will make you call your IT execs at the next break. (Wireline phones will be available.)

Nick Grouf, Firefly Network: Identity management

Last month, we described the Firefly Passport Network, a new offering from Firefly that helps individuals manage their profile information online and lets companies create networks that can share information about their vis-it-ors, as long as the visitors agree that they can.

Directories and people-search services abound online, as do individual sites that ask visitors to register and enter personal information. But Firefly's Passport proposition is so far unique. The Passport also neatly breaks Firefly's stereotype as a collaborative-filtering system company and creates a broader mission for the company.

What's at stake is who gets to represent customers on the Net: Who earns their trust, who holds their data — and who sells them to marketers. Many companies would like to take that high ground, on the assumption that it translates into customer loyalty, and makes market leaders harder to oust.

Maybe the role of "portal" — someone's default starting point — is less important than the role of trusted host and identity intermediary. Just in case this is true, many of the real and aspiring Internet portal players are looking more closely at identity management.

Nick Grouf, one of Firefly's founders and its ceo, has put Firefly in the front lines of companies setting privacy, content-rating and information-exchange standards on the Net. Before Firefly, Grouf was in Goldman Sachs' mergers and acquisitions department and in McKinsey's broadcast, media and telecommunications practice.

Jeff Levy, RelevantKnowledge: What do surfers really do?

Jeff Levy knows about as much about Web user behavior as anyone in the business. RelevantKnowledge, the company he co-founded (with Tim Cobb), has recruited a panel of 8000 people who have agreed to load a piece of software on their PCs that tracks where they go and what they click on and reports it to RelevantKnowledge. It's the Nielsen meter of the Net.

Panelists are recruited through random dialing and serve for two years; RK pays them $25 every six months for their help. They also fill out Web questionnaires, which gives RK the data it needs to build demographic profiles and match them with the behavioral data. Levy, an ex-First Amendment lawyer, has created strong privacy safeguards for RK and makes sure the panelists' individual demographic data is stored separately from the clickstream data and that both are encrypted. Levy wants to grow the panel to over 20,000. RK will expand to Canada and overseas later this year[1].

[1] RK's Swedish launched its panel last month; panels in Germany and Norway will start in the third quarter, with the rest of Europe targeted for 1999. Australia's panel should be operational by the end of 1998.

Last July, RK did a major enumeration project (calling 250,000 US house-holds) to collect data that would let it project statistically significant results about the entire US population from its panel sample, which includes users at home, work and college. In its most recent refresh of the enumeration study, RK extrapolated that around 55 million US citizens had been on the Web in the past 30 days, with 2 million new users getting to know the Web every month. Given this rate of growth, RK will begin updating the study quarterly.

Jeff be nimble

The company is leveraging its well-designed data complex and its Net connections: It has recently been beating its main competitor, Media Metrix (formerly PC Meter), to market with timely statistics. AC Nielsen, the obvious missing party, has not re-entered the market after its early attempts with I/Pro.

Levy got the idea to start RelevantKnowledge while he and Cobb were at Turner Entertainment Group. Levy was an entertainment attorney; Cobb was vp of business ventures at Turner Original Productions. They wrote the business plan for RK in their off hours during the summer of 1996. They left Turner that fall, raised a $925,000 seed round that December and a $6 million venture round the following July, led by JH Whitney. The company has grown to 60 employees.

RK's major clients are large ad agencies (IPC, DMB&B), large advertisers (IBM, P&G, GM) and large destination Websites (Netscape, CNN, Classi-fieds-2000). All these companies use RK's data to evaluate their ad campaigns' effectiveness and to negotiate ad rates (up or down, depending on the client's perspective).

Charles Morgan, Acxiom: Assembling identities

Acxiom started out as a small, regional data-processing company that specialized in direct-mail list cleanup and management. Some of its earliest projects were mailings for the Democratic Party and other non-profits. Charles Morgan joined Acxiom in 1972, after six years as an IBM systems engineer. Since 1975, he has been Acxiom's chairman and company leader — employees are called "associates."

Over the past two decades, Morgan has grown the company into an international presence in direct mail and customer profiling. Acxiom's 1997 revenues were $402 million, largely from blue-chip clients. When you re-ceive solicitations for "pre-approved" credit cards, for example, chances are they were processed by Acxiom.

Morgan pays a lot of attention to corporate culture and employee satisfaction. The company was ranked 38th in the most recent Fortune survey of the best places to work in the US. It is headquartered in Conway, AR, close to Little Rock, and has one of the largest data centers in the South.

To have or to hold

Until 1984, Acxiom never owned its data. It would clean other companies' lists and send them back, or manage a program and delete the files at its

conclusion. Then it began to create InfoBase, an enhanced, multi-source database of data on individuals.

The InfoBase overlays information from many sources that Acxiom rents or enters itself. Acxiom excels at fuzzy record matching and can link relatives, people who have lived at the same addresses, worked at the same companies and more. By combining different databases, it can derive expected interests, estimated income and other neighborhood census data elements. Morgan's goal is to build databases of the entire US consumer and business populations. He wants them accurate and up-to-date.

In May, Acxiom will open secure Web-based data access for its customers through the Acxiom Data Network (ADN), its first Internet service offering. The ADN isn't merely a mainframe database with proprietary access methods. It is ODBC compliant, so it works with desktop marketing programs.

Guns don't kill people...

Net access and multi-source databases raise thorny privacy issues that Morgan is working to resolve. He is on the Direct Marketing Association's executive committee; a colleague, Jennifer Barrett, is on its privacy committee.

Morgan points out that it's not the information that's harmful, but the way it's used. He takes measures to ensure that the information is treated with care and respect. Acxiom associates must sign a privacy policy when they are hired; customers have to sign a statement that they conform to Acxiom's data use policy. Still, it's easy to be skeptical.

Then he makes a more convincing point: "Inaccurate data is harmful, too." But avoiding errors and maintaining clean listings probably requires more access by the people whose data are in the database. Ideally, each of us maintains his own information voluntarily, with different degrees of disclosure, and some people opt out of the system altogether.

Opting out is a bigger problem than it ought to be due to the weak forms of authentication on the Net. Direct marketers don't want to make opting out as easy as sending e-mail, because pranksters will unlist entire towns. Database managers need confirmation that it's a real opt-out choice by the real person who is asking.

One solution might be to make opting in or out part of getting a digital certificate or a network Passport such as the ones Firefly is issuing (see **Release 1.0**, 2-98 and below). "That would makes many things much easier," nods Morgan. There are many good reasons to pull together various functions around identity — and just as many reasons not to.

TUESDAY: PRACTICAL INFRASTRUCTURE

PANEL: WHO WILL OWN THE INFRASTRUCTURE?

The telecom industry looks dramatically different from one year ago. Then, WorldCom was a small player, MCI a big one. Now the combined entity threatens all the big, established carriers. The FCC has new leadership; AT&T has a new ceo. Every communication company is feeling the effects of the 1996 Telecommunications Act.

Many different kinds of wireless and high-speed access are making it to market. In Europe and Asia, cellular-phone users can roam at will effortlessly; in the US, they often can't roam from region to region. Are there too many choices?

The Net is beginning to deliver on its threats to reconfigure the telecom landscape. New business models are beginning to appear. Tom Evslin is about to launch ITXC, an Internet phone company composed of collaborating ISPs. Soon some ISPs will announce two- or multi-tier pricing: At least, they will offer best-efforts Internet access that is much like today's service and premium, guaranteed-bit-delivery service good enough for live audio and video.

Plenty of problems remain. Who is responsible for access to schools and neighborhoods that don't earn enough to look attractive to sponsors or advertisers? Does the next decade promise Moore's Law kinds of advances in telecommunications? If so, how will we get there?

Susan Ness, FCC: Let it be, let it be

Recently, four of the five commissioners of the Federal Communications Commission were replaced by new appointees as their terms expired. Susan Ness is the sole commissioner to stay on (her term expires June 30, 1999).

The past FCC administration can be credited for not making ISPs pay per-minute access charges to the regional phone companies, for not subjecting ISPs to the regulations that afflict common carriers, for not restricting vendors of IP telephony from selling their products and for not mandating rules governing content on the Internet — all despite enormous pressure from some of the largest businesses and most strident politicians in the country.

Ness has focused her efforts on managing the radio spectrum efficiently, nurturing children's educational TV and helping hammer out digital TV standards. She has also participated actively in dozens of rulings covering all aspects of communications and acronyms too numerous to mention. A lawyer by training, Ness was a senior lender to communications companies at a regional financial institution before being appointed by President Clinton to the FCC in 1994.

Tom Evslin, ITXC: Making IP telephony happen

Despite the pesky matter of closing his company's second round of financing, Tom Evslin is a happy man. He is a month away from serving real

customers. His startup, ITXC, is the first Internet Telephony eXchange Carrier. ITXC's system turns a collection of companies that offer Internet telephony — ISPs, telcos, cable systems or resellers — into a single virtual network by monitoring, linking and billing for them.

In December 1994, Evslin left Microsoft and came to AT&T a confirmed Internet radical. He was convinced that the Net would change everything about the transmission of data. The fact that all that data included voice didn't occur to him until some months after he got to AT&T, when VocalTec introduced its IP telephony client. Although there were plenty of problems with IP telephony and still are, he believed that all the problems were amenable to engineering solutions.

In fact, as he prepared to launch AT&T's WorldNet, he came to the realization that circuit-switched voice is merely the last of the proprietary protocols that are going to get swallowed up by IP. "As all the functions previously done on proprietary systems come together on IP," he says, "a lot of problems disappear and a lot of creative power is unleashed. It opens a huge space for innovation in applications that include voice. It happens that the first one is just cheaper telephony. You can't predict what the innovations are, just that they will certainly happen."

Evslin estimated that Internet telephony was about five or six years behind the ISP business. As he wondered what to do about it, VocalTec president Elan Ganor approached him. Ganor's customers wanted VocalTec to be in the routing, billing and switching business, but he disagreed. He encouraged Evslin to start the service company. John Petrillo at AT&T agreed, and helped back the startup. Last July, Evslin started ITXC. It quickly outgrew the annex to his house in rural New Jersey and now has 30 employees.

How it works

ITXC buys termination from IP-to-phone gateway operators, which might include ITSPs (ISPs who have added telephony capabilities), ILECs and new CLECs (Incumbent and Competitive Local-Exchange Carriers) and resellers. It then sets up the virtual network, monitors the gateways for call activity and runs continuous quality checks.

Many IP telephony customers' calls can be completed on their carrier's network, in which case ITXC doesn't get involved. If the destination phone number is off the originating caller's net, the originator's gateway sends an inquiry to ITXC's gatekeeper looking for a compatible gateway. Sometimes ITXC will have to patch the call via normal phone lines, but it can often provide end-to-end termination over the Net (or at least city-to-city termination, since the local loop is almost always a phone line).

When it finds the right destination carrier for a given call, ITXC gives a digital token to the originating gateway, which it uses to tell the terminating gateway that it's okay to complete the call. Both carriers give ITXC their call detail records, which it then issues bills for appropriately. Getting this done at high performance and quality requires lots of quality-control and routing expertise.

ITXC runs the virtual network, but the service is branded by ITXC's customers. Evslin thought that ISPs would be his first customers, but instead

callback companies and prepaid calling-card companies moved first. It makes sense: They are cost-sensitive outfits with cost-sensitive customers who do lots of international calling.

More advanced applications will come later, Evslin says. He is also avoiding Internet fax because it would be a distraction; he also believes that soon faxing won't be a problem because Internet faxing will rapidly become commonplace. Evslin shocked many AT&Ters by getting WorldNet off the ground so quickly. Now he hopes to give the telecommunications market a bigger jolt.

John Sidgmore, WorldCom: Scale is relative

What a difference a year makes. Just two years ago, John Sidgmore ran UUnet, the largest of the small ISPs trying to invent the commercial Internet market. Then WorldCom bought UUnet... and a rash of other companies, including ANS and CompuServe's network from AOL, Brooks Fiber and (in November 1997) MCI. Things look different to Sidgmore now. He has a lot to work with, including the added title of vice chairman and coo of WorldCom. MCI WorldCom (the combined entity's name) is now stronger in local, international and Internet services than most of its competitors.

Scale is Sidgmore's biggest concern. "The voice network grows at eight percent every year," he notes, "and we have to grow our Internet capacity at 1000 percent. Within a few years, voice is irrelevant — a niche market. Voice won't matter.... Internet growth is running wild and there's no end in sight." He also points out that all the recent growth has been from new subscribers. New applications have hardly been touched; many will need enormous amounts of bandwidth. The coup de grace: Revenues aren't growing at 1000 percent per year. Somehow, he has to do more with less, dramatically.

To grow networks at these rates, you can't rely on recent technology history. WorldCom has its own R&D labs and was quick to market with dense wave-division multiplexing systems. It is working with new gigabit switches and fast routers from traditional vendors such as Cisco, Nortel and Lucent; it is also funding and buying from some startups, such as Juniper Networks.

Scale magnifies back-office woes. "There seems to be an inverse relationship between your growth rate and how well you're managed," he notes. "I used to joke with Steve Case about why anyone would ever invest in either of our companies." Now he is hiring more and more traditional managers to add discipline. Billing, provisioning and other transactional systems are now critical. "This is not just e-mail any more," he adds.

Plenty of opportunity

After the acquisition dust settles, MCI WorldCom will have two businesses focused on the Internet and internetworking. One will offer the platform: basic Internet access and related products such as IP fax and IP telephony. The second will use that platform to deliver value-added services such as Web hosting, e-commerce, extranets and intranets. The company will consolidate its various network backbones, but it will continue to run multiple dial networks at different price and quality levels.

Despite the fact that Williams Communications, Qwest, Level 3 and other competing carriers are all adding capacity, Sidgmore sees plenty of margin for years ahead in providing basic communications services. He predicts that backbone capacity will be in short supply for many years and notes that local markets are very congested.

“Competition exists in the long-distance segment and for large business customers,” he notes, appreciating the resources at his disposal in MFS, Brooks Fiber and MCI Metro, “but in local service, it won’t be there for a long time.” Of the many potential bypass options for local service, Sidgmore gives Internet (ADSL or ISDN) or cable the best odds in the near term, but adds that the problem with all local bypass options is that their economics for ubiquitous use are questionable. Players positioned well will do well for a long time. WorldCom suddenly has a great head start.

Charles Sirois, Telesystem: Dances with PTTs

Only 20 years ago, Charles Sirois was fresh from a Master’s degree in finance, looking for entrepreneurial opportunities. He was interested in telecom, robotics and biotech, but thought the latter two industries not developed enough to need a financier. He felt personal communications had a huge future, so he bought his father’s paging system in Quebec for $150,000 and proceeded to grow (and acquire) it into the dominant paging system in Canada.

In 1985, he shocked Bell Canada by offering to buy Bell Cellular, its cellular arm, when it was still relatively small. In 1987, Sirois upped the ante and reversed the deal: Bell Cellular bought his paging properties to form BCE Mobile Communications, which he ended up managing. Never a fan of phone companies, in 1990 he and some investors bought Teleglobe, which for now has a legal monopoly on international calls from Canada.

At 43, Sirois is the chairman and ceo of Telesystem Ltd., a private holding company that numbers among its holdings Microcell Telecommunications, the first PCS (Personal Communications Systems) carrier in Canada; Telesystem International Wireless (TIW), its counterpart abroad; Teleglobe, one of the leading global telecom carriers; Telsoft, a software venture fund; and Microtec, a home-automation system supplier. Sirois is also the chairman and ceo of Teleglobe and the chairman of Microcell and TIW. (Disclosure: Esther is on the advisory board of Teleglobe and the board of Tele-system.) In his spare time, Sirois wrote **The Medium and the Muse**, a sort of Canadian **Road Ahead.**

Valuing openness

Despite Teleglobe’s monopoly, Sirois is an ardent proponent of deregulation and has pushed the Canadian government to open Teleglobe’s historic market to competition, which it will do as of October 1 this year. In turn, he is pushing Teleglobe into high-growth overseas markets aggressively.

Sirois is also a great fan of the Internet, which he feels companies are barely using. “People don’t do real business yet on the Net,” he says. “It’s just a window on companies now. They don’t exchange data much, they don’t talk over it and so on. And carriers can’t guarantee delivery of Internet traffic yet.” But he doesn’t use e-mail much, Esther notes.

The medium's potential thrills him. "The Internet shifts power from suppliers to users," he says. "Value-added services will live in an open platform that will carry voice soon. Each layer of the infrastructure [routers, transmission lines, network intelligence] can be owned independently and leased among companies. This could never happen before."

Sirois enjoys seeing how technological and market forces act on industries like telecom and where they create value. He also enjoys assembling talent. "Knowledge is better than money," he says. The knowledge he's built over 20 years makes Telesystem a serious challenger in fast-growing markets such as international telecom and personal communications.

PANEL: SECRETS AND CERTIFICATES

Broadly speaking, the Internet's security is based on businesses restricting their transactions to partners they already know and consumers' use of credit cards. Firewalls keep out "bad guys," but they often keep out good guys or useful information and messages as well.

Ironically, the public at large is both too worried about security, and not worried enough. Because people are not worried enough, they are creating tremendous vulnerabilities, which are likely to result in some huge disasters down the line. One reason people don't worry is that victims of security breaches don't like to disclose their mistakes or vulnerability in public. Insurance companies, which should be playing a part by charging high rates to the insufficiently security-conscious, by and large aren't focusing on the dangers. Put that another way: The market rates for such insurance are probably below what their real cost will be. Chalk that one up to a market inefficiency that will be corrected before too long. (Is this perhaps another place where disclosure should be required? The US Government and the Securities and Exchange Commission are already requiring disclosure of Year 2000 exposure.)

Meanwhile, consumers seem to be getting over their distrust of the Net as a transaction medium. More of them have successfully purchased goods online, and there are few credible horror stories. Some have even returned goods they bought online, and had their credit card balances duly credited. But they are buying mostly from brand-name vendors, well-known catalogue re-tailers or new brand names such as Amazon.com. What will it take to get them to trust the new vendors that are the real promise of the Net?

"This is one of my pet peeves," says Stratton Sclavos of VeriSign (below) with some heat. "There is a huge education process that needs to occur, but I'm not sure who will take the lead or how to roll it out. Close to 50,000 Web servers now have digital IDs that enable secure transmission of information to and from a customer. In our opinion, this security mechanism is more robust than traditional systems including mail order and telephone order, but we still see consumer fear at high levels; one large travel site I know believes that 50 percent of its visitors turn away before purchasing because of the perceived lack of security."

Various intermediaries besides VeriSign are turning up; their primary function is not so much information about the goods or services offered, but certification of the players. Some are market-makers such as OnSale or

e-Loan who qualify their vendor members; others, such as Intuit, force disclosure. Emptor will offer escrow services. Others are “regulatory” organizations such as TRUSTe, taking on some of the functions (or would-be functions) of the Federal Trade Commission or other government organizations. The FTC itself, along with various government organs in Europe and other countries, is watching warily: Will these emerging intermediaries have enough teeth to be effective?

The technical underpinnings for the ideal world we’re hoping to see include many features supported by encryption technology: It can conceal secrets as well as confirm a person’s or entity’s identity. It can also guarantee the integrity of a document. In essence, this is because cryptography is asymmetrical: It’s easier to scramble a message than to recover it; if the key to someone’s digital certificate is properly secured, no one else can reconstruct a certificate to highjack that person’s identity. That can be linked to the unique physical characteristics of each person — DNA, fingerprint, retinal scan, or whatever.

The challenge is how the computer market will adopt and implement these capabilities, which need a social and legal infrastructure as well as technical capabilities to work.

Larry Summers, Treasury Department: Transparency and markets

Larry Summers has been deputy secretary of the Treasury since 1995. He has spent considerable time examining the rules and performances of many different local markets around the world: Before becoming deputy secretary, he was Under Secretary for International Affairs, and before that he was chief economist for the World Bank (and a professor of economics at Harvard). Recently, he has been spending a lot of time at home and “on location” dealing with market failures in Asia. He has also been subtly critical of other substandard markets, including the Czech government’s, which touted friction-free capitalism but was actually buddy capitalism under the covers. All these markets, with their own local rules, are increasingly interconnected.

The most necessary, most basic rule for all markets, says Summers, is transparency. First, it investors get information so the markets can do their work, finding the true values for things: this means not just that existing products are priced appropriately, but that investments in new products and services reflect demand and likely returns.

Second, transparency can actually change people’s behavior — for the better. The worst actors are driven out; the borderline cases may be forced or lured into honesty and correct dealings for fear of losing opportunities for future business.

And finally, says Summers, transparency impedes contagion, when one sick market infects another. Or to use John Holland’s terms, it impedes induction, where market failures in one market — such as an overvalued currency or large-scale investments in unprofitable projects — can pull down one economy after another.

How is transparency to be achieved? Interestingly, for a government regulator, Summers focuses not just on market rules for disclosure, but on the

need for a free press. There has never been a mass famine, he points out, in a country with a free press. Famines are a result not of market failure, but of market absence.

What works, and what doesn't? What happens when a "legitimate" government doesn't enforce the rules? Will people migrate to honest markets now that the Net allows them to? Can others, less honest, use the Internet to hide? What is actually happening in world markets and what should we do about it?

Stewart Baker, Steptoe & Johnson: He knows what they know...and he's still pro-crypto

Stewart Baker practices law as a partner at Steptoe & Johnson, one of Washington's better-wired law firms, with a concentration on high-tech and telecommunications, especially in international matters. He has worked on both dark and light sides; from 1992 to 1994 he was general counsel of the National Security Agency, where he was actively involved in explaining the agency's policies concerning export controls, encryption and security. How involved he was in formulating versus modifying those policies he will not say, but he now mostly represents clients in the private sector who find those policies onerous or restrictive. Earlier, he worked as deputy general counsel in the Department of Education, and he clerked for Justice Stevens of the Supreme Court. His clients include all the usual suspects... and that's no joke. These are the people who will be fingered when it is inevitably revealed (or claimed) that some terrorist used encryption in carrying out an attack. (Never mind that he or she will probably also have used a car and a fake driver's license, and have passed through airport security at some point.)

Baker's job is to keep abreast of all these issues; he probably understands both sides of the arguments better than anyone else around. With Esther, he is a member of the Subcommittee on Encryption organized by the Bureau of Export Administration; he is also involved in various ways with a wide variety of other groups and initiatives. He founded and provided legal counsel to the Information Security Exploratory Committee, a group created as a private-sector alternative to the so-called Marsh Commission, formally the President's Commission on Critical Infrastructure Protection, chaired by former Thiokol ceo (and Air Force four-star general) Tom Marsh. (Another member of Steptoe's "Team Crypto," Elizabeth Banker, provided legal advice to the Marsh Commission itself.) Says Baker, "The Marsh Commission brought forth a mouse, but fortunately no new regulatory burden. It accurately pointed out that people who want to break into systems are not the only risk. Oxford Health may fail because of a bad computer system. That's the first time a cio has been responsible for a significant company failing. Overall, it identified a problem, but to everyone's relief they didn't come up with a government-mandated solution." We'll see what happens with the Encryption Subcommittee...

Of course, encryption *is* part of the solution, despite the perception of some that it's the problem. "Export controls continue to give way," says Baker. "HP's [recent permission to export VerSecure, a crypto product] is a significant piece of ice falling off the iceberg. However, such loosening of controls is still on a case-by-case basis, and almost always involves compromises such as built-in facilities for third-party key escrow."

"There's more liberalization to come on exports," Baker continues, "but a much longer debate on internal controls. Gradually piece by piece we're winning the export fight. No one who seriously needs crypto can't get it or sell it. But [FBI head] Louis Freeh will not give up on domestic controls. If you want to know what an FBI-administered program of encryption controls would look like, you don't have to look far. The FBI already regulates one big chunk of the high-tech industry — telecommunications."

Baker's practice includes substantial work negotiating (and litigating) with the FBI on CALEA (the Communications Assistance to Law Enforcement Act), which mandated but did not sufficiently fund technical means for real-time government access to the content of telecommunications. That has resulted in an embarrassing fight: Many telecom companies do not particularly want to do the government's bidding on this issue, and they certainly don't want to do it with their own money. The whole effort is likely to slide into messy multi-party litigation at the FCC and elsewhere.

Meanwhile, there's a big battle over key escrow. The issue here is not that government could get access to keys for stored data; corporate key recovery for stored data is "about as controversial as tape backup," notes Baker. The issue is that it wants to be able to go to third-parties in real time to listen in on conversations. Aside from the political/social issues, many people are concerned that governments are no more capable of managing keys than they are of managing drivers' licenses, tax records or other sensitive information. Then there's the question of the rest of the world: Not all governments are as benign as ours (such as it is), nor do citizens of other countries particularly want US-certified key management systems. You can no more legislate trust than you can buy it.

Stratton Sclavos, VeriSign: Yes, it's really him!

As we discuss on Monday, disclosure creates trust, which helps markets and society thrive. But you have to know that the person or entity you're dealing with actually is that entity, which can be harder in cyberspace than in the physical world.

For example, Juan wants to know that the e-mail from Alice really is from Alice, and not from some impostor. He also wants to know that the Website he's visiting really is Alice's Restaurant, and that the recipe for the banana bread he's ordering will be the genuine article. He may also want to know more: that Alice will not sell his name to Tupperware or anyone else, that he can believe her claims that she's using only organic bananas, that she employs only adults, especially if she's located in some other country. US laws may not apply.

And if he has a problem, chances are he will not call the FTC or even the Better Business Bureau. He'll probably call American Express and try to reverse the charge.

It gets even more complex if Alice doesn't take credit cards and he can't get his money back from Visa or American Express. He may look for certain seals on Alice's site. Before he communicates with her, he may want to check that she truly earned a *Grande Diplome* from Le Cordon Bleu. Moreover, what was true yesterday may no longer be true today. (See **Release 1.0**, 2-98.)

All this makes it clear, notes Stratton Sclavos, ceo of VeriSign, that certification is not a one-size-fits-all business. VeriSign is in the business of creating and managing digital certificates. “We thought at first that all we had to do was certify someone’s authenticity, but we quickly found out it’s more complicated than that,” says Sclavos. “We thought there would be one certificate per identity, but actually there’s one certificate per relationship. For example, we certify people as holders of credit cards, employee badges, banking or brokerage accounts, as members of a community of interest or commerce (such as an automotive network exchange), as citizens.” Each customer has its own requirements for how long a certificate can be valid, what it certifies, what causes it to be revoked and the like.

VeriSign, created in 1995 as a spin-out from crypto company RSA Data Security, now has a variety of lines of business, ranging from personal secure IDs to large-scale identification and authentication programs for organizations operating worldwide. So far, the company has issued over 2.5 million digital certificates to consumers and 50,000 to businesses (to identify their servers over the Internet). It is currently issues about 200,000 new certificates per month and is busily moving into the enterprise space with digital IDs for intranets, extranets and large e-commerce solutions (e.g. digital credit cards for Visa). Customers include everyone from Skandia, the Swedish insurance company with 70,000 employees world-wide, each certified as to rank, level of information access, e-mail address, department and the like, to a broad range of banks, and thousands of individuals who use it in their relations with a variety of Websites, including most notably Netscape’s.

Knowing someone’s identity is only part of the challenge. You also have to be able to believe what they are saying and keep the messages secret and unmodified as well. You may want to be able to prove you sent a certain message — or that someone else did. The technology is only a small part of the infrastructure; about half of VeriSign’s revenues come from corporations who license the technology to use as part of their own systems, with an infrastructure of access rights, permissions, and other identity-dependent policies. About half comes from customers who buy their digital IDs from VeriSign directly.

Sclavos is an old hand at introducing new technologies, with experience leading sales and marketing at GO and Taligent as well as MIPS. Now, as ceo of VeriSign, he has a chance to implement as well as market, for better or worse.

PANEL: BRAND VERSUS EXPERIENCE

The *New York Times* recently ran an article lamenting that attention to customer service is hurting the country’s productivity. Excuse me, but how lame can you get? Our take on the same phenomenon is pure delight that consumers recognize the value of personal attention. And it’s a good sign that there will be something for people to do even as more and more work gets automated and devalued.

Indeed, the Net is likely to be far more people-intensive than most investors and strategists recognize. Brands depend on personality/ies. And

customer satisfaction depends not on giving attention to a brand image, but also occasionally on getting attention from a real-live person representing a vendor.

In some odd ways, cyberspace is about reality as much as about image. Advertising is one-way, but cyberspace is two-way. Did the company respond to your e-mail? Was the help-desk person helpful? Did the product you ordered arrive on time? Amazon.com, for example, started with no brand name but built an online reputation based on customers' experience.

Traditional companies need to understand that their cyberspace presence is more than a Website; it's a continuing interaction with people they may or may not have invited. And you can't just avoid it, or they'll be talking there without you...

Jeff Berg, ICM: Stars in an age of virtual personality

In a world of simulated reality, reproducible content and interactive software, one of the few unique things left is human beings. Marketers and vendors of all kinds aspire to attract their attention. But in a manufactured, digitized, artificial world, the thing that best grabs people's attention is...other people. As denizens of the content world know, content sells more on the basis of people than of brands — other than, say, business information. We in the newsletter business have known it for a long time: there's Stewart Alsop, Chris Shipley, the Seybolds... Online there's Jesse Berst, Matt Drudge, Phil Agre, Dave Farber. This publication was known as the Rosen Letter long after Ben Rosen left it. "Titanic" may make a lot of money for Fox and Paramount, but what people remember about it — and will look for the next time they go to the movies — is Kate Winslet and Leonardo DiCaprio. Yes, people go to destination sites, but what they are looking for is personality.

If you look at the last few decades, the returns to individuals (and their agents) have increased, even as returns to capital or physical assets have gone down. Employees by and large are getting better deals from their employers, and "star" employees are getting the best deals of all. When a company hires a new ceo and the stock price jumps 5 percent, it means something. Whatever the new ceo actually does internally, his presence makes it easier for the company to raise money and compensate employees. But in the end, the management creates value by exciting the passions of others, whether employees or customers. They in turn excite others.

Jeff Berg, chairman and ceo of International Creative Management, is in the business of finding, creating and managing stars — what he calls "unique artists who will have long-term careers." They include people such as Steve Martin, who actually does use the Net for his writing, and others such as Michelle Pfeiffer, Julia Roberts and Mel Gibson. Much like a venture capitalist, ICM first of all has to make good picks. Then, also like a VC, it has to guide the "properties" it has bet on. "We do it by negotiating the deals and understanding how the dollars flow — first rights, ancillary licensing, that sort of thing," says Berg. "Of course we're looking at the Net, but we see it more as a distribution vehicle than as an artistic medium — for now."

Nonetheless, Berg has closer ties to the world of heavy-duty technology than you might expect: He sits on the board of Oracle Corporation and is co-chair of the California Information Technology Council. Call him a one-man model of convergence.

Scott Heiferman, i-traffic: The value of presence

i-traffic started when Scott Heiferman, working for Sony Electronics in 1994, was trying to drive traffic to Sony's AOL area by getting it linked from the AOL home screen. At the time, AOL was "not in the media business" and had no capacity to sell Sony that presence. Heiferman simply called the techies who could make that presence happen, sent them a couple of Walkmans, and got the link installed.

That was the good old days. Now getting people to promote your links is a business, and i-traffic is its conceptual leader. The company now has 50 employee/owners and clients such as BellSouth, CDnow, CNN/Sports Illus-trat-ed, Eddie Bauer, Hearst, NetGrocer, and other transaction-focused online marketers. Founder and ceo Heiferman has two grown-up partners from the advertising business, coo Ed Dintrone from Bates Worldwide, whom he found through a newsgroup, and chief service officer Peter Meluso, formerly Dintrone's boss.

Many brand advertisers focus on banner ads and branding; i-traffic sees the Web as interactive and focuses on placement from the vendor's point of view. "To Joe Netsurfer, i-traffic means nothing, but he's clicked on a link we've placed," says Heiferman. "People find their way to sites either by typing in URLs or clicking on links. We focus on the clicking part, managing the links to client sites."

Indeed, i-traffic calls itself a "linking" agency rather than an advertising agency, because "linking" is a digital hybrid of merchandising, real estate planning, Yellow Page advertising, and strategic alliances. Rather than focus on demographics and what people may want sometime, i-traffic focuses on location and what people *most likely* want because of where they are at any particular time. That is, demographically, you may be a prime candidate for a vacation in Barbados, but if you're looking at the Lexus site you're probably more interested right now in car loans or car insurance. "We focus on the utility aspect of things, as opposed to shoving an image into someone's face," says Heiferman earnestly. "We try to combine relevance and interactivity. It's not brand versus experience; you can have both. It's recognized that attention is the valuable commodity, but it can be respected or dissed. You have to get attention for what they want, not for what you think they might want." He likens it to putting vending machines all over the planet: You may want a Coke when you're at a sports club or at a movie or in your own home. You shouldn't have to call the Coke bottling plant to get a drink.

The central proposition of i-traffic is not to try to persuade the consumer, but rather to catch him at the right moment. "It's self-selecting experience," says Heiferman. "You're not being subliminally trained; it's not an infomercial. It's selling, not marketing, but in a way that approaches pull rather than push."

The company is now working on what Heiferman calls “advanced levels of profiling and targeting. We are starting to do work with one of the big auction sites online. I always thought you should do only pull, but we’ve got the idea of almost syndicating these auctions online. If someone is looking at laptops somewhere, we can send them info on what’s on the block in real time. It stimulates demand in a way that’s fun. Let’s see; you’re reading **Release 1.0.** Can we help you book a trip to Tucson? Do you need a bathing suit? We target based on activities rather than demographics.”

Halsey Minor, c|net: Apostle for branding

c|net ceo Halsey Minor, a former investment banker for Merrill Lynch, has a good nose for changing markets. After starting the Global Publishing Network, which built an intranet for Merrill Lynch, he started c|net: The Computer Network in 1992. Originally, it started as corporate/educational satellite service and then a consumer-oriented cable channel tied to online. But it quickly morphed into a full-fledged Web-based online news service as the Web matured more quickly than Minor had expected. From taking on Ziff-Davis in a new medium with c|net’s own content, he has expanded to taking on America Online with content aggregated from others. The company’s Snap, an online aggregator, is an ambitious project based on branding and market share. “The cost of building a Web brand is going up stratospherically,” says Minor, so c|net is spending lavishly and early to make Snap a success. “The noise level keeps rising; you either get enmeshed early, or you don’t make it at all.”

“Brands matter just as much online as off,” insists Minor. “Just as a reporter for the New York Times [John Markoff notwithstanding] needs the New York Times, so does an online reporter need a place where traffic congregates. Most of Matt Drudge’s distribution does not come to him, but he gets amplified by being quoted by brand names. Michael Slater’s Microprocessor Report, and for that matter, **Release 1.0**, get amplified through these branded media.” In other words, there’s synergy...

Getting the incentives right

Minor believes firmly that advertisers should pay for brand environment and exposure rather than click-throughs. “Being in News.com is a lot more valuable than being in some unknown place. The trouble with paying for click-throughs is that the incentives are backwards. The successful companies pay more.”

“Suppose we started Halsey-Dyson Computers and started advertising online,” he continues. “If Z-D took it on the come and charged for click-throughs, they’d be using up space and generating almost no income, while we’d be building up our brand over time. It would cost Dell more to run an ad (and get all the click-throughs) than you and me. It lets little companies build brands more effectively than big brands. It’s an irony for P&G to be the ones to push for pay-per-click. This came out of the fact that you actually can track it, but it doesn’t make sense to pay for it that way. Every direct advertiser studies how many people respond, and the ones who don’t get responses eventually give up because the rates for the space aren’t cost-effective. You let the market allocate efficiently.”

"Of course," he allows, "pay-per-click won't go away entirely. It's nothing new; in print, it's called PIB, for per-inquiry basis. It's generally used for remnant inventory, the kind of thing DoubleClick does over their network, with commodity space. You don't know where your ad will appear."

Aside from trying to persuade investors that his spending on branding will pay off in the long run, Minor's greatest current challenge is living down the attention he got for a recent statement to employees: "As it turns out, great editorial is not a goal in and of itself. For us, great editorial simply supports a larger mission of helping consumers and corporate buyers find and acquire the right product for their individual needs."

He rises to the occasion and points out that he was not trying to devalue editorial, but rather to say that the company has to become more customer-focused: "At some point you have to ask customers what they want, do focus groups. We're moving from being editorially driven to being customer driven. We're not going to sell editorial or erase the line between edit-orial and advertising. Let's say to consumers, 'What do you want? Prices, bulletin boards? Chat?' Let's find out what they want. I was talking about bulletin boards! Nothing to do with advertising. Everyone overlaid their worst interpretation... We're going to open ourselves up to people who are thinking more deeply about what customers want. The last thing we want is Yahoo! to become more useful than we are."

Is that clear? In fact, Minor is such a good interview it's almost superfluous to add our own editorial.

Stephanie Forrest, University of New Mexico: Identity and immunity

Traditional human security systems rely on identification of known elements — the digital signatures of known parties (good) or known viruses (bad), the identification of individuals as recognized employees or "authorized users" of one kind or another. They use positive recognition tools, such as a strand of DNA, a protein, a fingerprint or a digital signature.

But as computer systems become more complex, just like life itself, maintaining security also becomes more complex. We know this is Juan, but is he really one of us? Is this code ours, or something from an intruder? And how can we notice when an employee starts behaving suspiciously? Is he the human equivalent of a cancerous cell? (Of course, you can get meta-physical, too. What of the rebellious employee who disobeys the orders of a bad or corrupt boss?)

These questions fascinate Stephanie Forrest, associate professor of computer science at the University of New Mexico and an external professor at the Santa Fe Institute. She has been working on them since 1989, when she car pooled between Santa Fe and Los Alamos with Alan Perelson, a theoretical immunologist. (Perelson is best known for his ground-breaking work on AIDS.)

At Perelson's urging, Forrest began exploring the concepts of immunity as applied to computer systems. By and large, living things don't rely on positive-recognition approaches such as those used by most computer systems for internal security. Instead, they use a variety of "negative-detection

systems" that operate in a distributed way. When we first wrote this we said they do so "because" it's a better way, but Forrest, a punctilious scientist, stresses that she doesn't know why things operate the way they do; she just knows the effects of their behavior. But in computer science, fortunately, we can learn and do things on purpose.

Here's the idea: An organism generates immature immune-system detector cells with randomly patterned detector/receptors on their surfaces; in humans, this happens in the bone marrow. The cells then move on to the thymus to become mature. Those with patterns that recognize (or match) the organism's own cells are "censored" and destroyed.

The patterns on the detector cells that survive (only about 2 percent of the total) are thus random patterns that do not match anything within the organism itself. Accordingly, if a detector cell subsequently encounters anything that matches its patterns, that matching entity must be a foreign intruder (or some internal mutation).

Distributed recognition

In essence, this is a way of making a distributed recognition system: Rather than requiring every piece of "self" to have a signature that could be forged by an intruder, it allows the self to be negatively imprinted on a large number of different cells that then recognize intrusions in a diffuse and hard-to-bypass way. (We may have described this a little too much as if it happened on purpose, but that's the overall effect!)

Forrest first applied this idea to viruses in DOS. Then she worked with SPARCs and UNIX and moved on to more general intrusion-detection problems in UNIX. She was looking not just for external viruses but also for malicious behavior implemented in unusual code sequences, such as a series of e-mail messages to outside computers or unusual sequences of system calls to the kernel. These things are really hard to define or notice in any explicit way, but they are often signs of bad behavior and worth paying attention to. But Forrest, a real-world user as well as a scientist, notes, "You can't notify a sysadmin every time something unusual happens. The sysadmin job is too hard already. If all we can do is send more messages to sysadmins, we won't have gained much. Most of this stuff is going to have to be handled automatically, with automatic escalation if things persist. First you can just make certain requests lower-priority before you notify someone or stop them altogether."

Forrest's work highlights the value of diversity. "We live in a monoculture," she says. "Every single copy of Windows NT is the same; if you can figure out one, you can get them all. Without diversity, all systems are vulnerable to the same attacks. The way biological systems get around that is to have a diversity of species as well as of individuals. Healthy immune systems depend on an overall population capable of surviving even as some individual members succumb to attacks. As for computer systems, the trick is to figure out how to make the underlying implementations diverse — perhaps with different binaries or physical memory addresses — while still maintaining high-level compatibility for users and applications."

WEDNESDAY: IMPLICATIONS

PANEL: THE NET RECONFIGURES BUSINESSES

Over the last 100 years, businesses have responded en masse to the industrial revolution. It brought huge benefits by raising the productivity of individuals by equipping them with machinery, and it made it hard for individuals to be competitive without a big organization behind them. Mass production became the order of the day, and economies of scale ruled. The larger the scale, in most instances, the simpler things had to be. All restaurants — or call them outlets — in the chain use the same burger recipe. Federal Express was founded on two principles: Overnight delivery could create a new market. And, distance flown is less important than simplicity of operations, meaning that a package could profitably travel overnight between New York and Connecticut via Memphis, Tennessee, because of the benefits of economies of scale.

But things kept getting more complex as companies tried to control vast operations more efficiently. Companies such as Intellection designed software packages to control production lines down to the last second, centimeter or gram of material, based on intensive predictive algorithms and assumptions about customer orders. Software companies faced huge challenges in controlling increasingly large and complex projects.

With the Net, all this changes back again. What used to be economies of scale are becoming diseconomies, as smaller companies use IT to their advantage in competing with giants. Nimbleness rather than mass rules.

Companies are beginning to realize that the best way to control complexity is to swing into it rather than to fight it. Put up a Website and give (some) control back to the customers; let them participate in production-scheduling according to their own priorities. Let your employees pick their own set of benefits. Let outside programmers do your incremental programming and bug-detection. Let your customers tell your operations what they want.

Obviously, this is easier said than done. While a company needs to retain its identity, it needs to create more porous, transparent borders with the outside. It needs many faces — people — communicating with the outside rather than a single impenetrable canned surface (which means as noted above that it needs happy employees). Many companies put up a Website as a project within marketing or IT, and then wonder why it doesn't do much for the company as a whole. In fact, a Website is only decoration unless it is firmly planted into the corporate body.

A transaction site needs to link into the company inventory and production-scheduling system; a company's behavior on the Web needs to match what is promised by the Website's graphics and tone. If your management secretly despises the kids who de-signed the Website, you can expect the same attitude back from the custom-ers attracted to the Website. Do people on the company help desk know what it's saying online? Do the swimming pool hours on the Website match the schedule of the attendant who runs the health club? (We know all about this one!)

Jim Barksdale, Netscape: Ultimate outsourcing

Netscape president and ceo Jim Barksdale has one of the most interesting and challenging jobs in the world, competing with the most successful software company in the world. Currently, he is doing typical Net-duty — fine-tuning strategy. Netscape got its start — and its initial market share — by distributing its browser for free. Then it started charging for a while, and picked up some useful revenues before changing tack again. Now it has gone even further in the free software direction, not only distributing its software for free, but freeing the source code to allow anyone to "enhance" or modify it. You can read about this approach in two excellent articles, "Linux and Decentralized Development" by Christopher B. Browne and "The Cathedral and the Bazaar" by Eric S. Raymond, in First Monday (www.FirstMonday.dk).

The idea is that a group of programmers, working without formal coordination, can over time produce a better product, better debugged, than can a tightly managed team following a detailed schematic. Of course, this probably works better with a tool such as a browser than with an accounting package. And there does need to be some designated "authority" who defines reference releases and manages the less creative aspects, such as documen-tation and interface consistency.

Someone sent Raymond's article, floating around on the Net before landing at First Monday, to Barksdale, and he read it with great interest. "We had him come out and talk to our group," says Barksdale. "Quite frankly, that was what swung me over. He's a different kind of guy. He gloms onto you.... It's egoless programming. It's what Michelangelo might be doing if he were alive today. He'd say, Let's just get together and paint the Sistine Chapel without assigning credit to anyone in particular, but he'd be acting as the coordinator." Of course, Netscape now has the role of the authority, giving the program an identity as a product, managing documentation and support.

It's an exciting experiment, no matter what kind of software it produces. Netscape, which has been operating under something of a cloud recently, has regained energy. "You could call it 'Netscape retakes the Web!'" says Barksdale with glee. "We started Mozilla.org [also reachable under Mozilla.com]. Some of the original guys are involved. They're so excited, on Cloud 9, all they can talk about is how they're going to coordinate it. That's what they're jazzed about. Right now, they're cleaning up the source code. You know source code; they do it all late at night."

"You end up with a released product with the same commitment to the customers you had before, but debugging and quality assurance portion is a little different. It goes against all conventional wisdom...but so did Federal Express in its day. Sure, someone else could embed a virus, but there will be 10,000 people looking to find it. All my people tell me it improves the code, and now we have to prove it."

In a world where the quality of people matters so much, Barksdale's approach should generate not just better code but enthusiasm among employees and customers. "We put up a one-page agreement on our source page," he says, "and we had 4000 people sign up almost right away, with forecasts of 50 million copies to be distributed. By leveraging the power of the Web, we can out-resource even Microsoft!"

That remains to be seen, but Netscape has the industry's soul even as Microsoft has its pocketbook.

Michael Dell, Dell Computer: Flexible short-term, steady long-term

Michael Dell is the world's poster boy for doing everything the old-fashioned way, even Net commerce. We first met him more than casually during a weekend offsite in Santa Rosa, CA, way back in 1986. This boy wonder, best-known for selling off-brand PCs from his dorm room at the University of Texas in Austin, was saying all the right things: "We have to respect our customers and our employees. We need to control quality, so we should deal with our customers directly rather than through dealers. Let's build a real company, not a marketing organization. Let's be organic. Let's bring in some senior management; I know I'm young and I have a lot to learn." The team of about 10 employees — out of a whole company of 150 at the time — participated vigorously in the discussion.

We remember thinking: "Boy, I hope they have the strength and commitment to really do all these wonderful things they're saying!"

Some 12 years later, we are thrilled that our early hopes have been realized (a rare occurrence!). Nothing lasts forever, but Dell has delivered on its promise — both in principle and in execution. This company is still growing at more than 50 percent per year, in both revenues and profits, yet it has never made an acquisition. It is selling its products successfully over the Net — and is lucky (or let's face it, smart) enough to have been selling direct from the start, so it has no worries about annoying an existing dealer channel.

In a sense, Dell was Net-based from the start — interactive and customer-focused. Moreover, it is customer-focused in operations as well as in sales: It produces its goods on the basis of consumer orders, not on sales forecasts. In effect, it lets its customers control the production line, which avoids inventory swings, overstocks, obsolescence and repricing — but requires discipline and execution from the company and its suppliers. That in turn lets it achieve an amazing 40-plus inventory turns per year.

Ironically, Dell is not a good model for other would-be Net sellers, because it has had to go through few wrenching changes to adapt. But it is learning, too. Says chairman and ceo Michael Dell: "We are making dell.com the first point of contact for all of our customers. Dell.com reduces the cost of doing business for our customers and for us, as well as making it easier for them to buy."

For several years the company has handled large corporate accounts such as Ford and Boeing directly with outbound salespeople; now it also builds customized support Websites for them, loaded with goods and prices as approved by negotiation for Ford employees (including budget limits based on each employee's profile). Dell has built about 1200 of these customized sites so far. Now it is working to expand that capability lower and lower, or broader and broader, into its customer base. Dell.com operates all over the world with sales in over 30 countries and local language sites for most countries. Ten million people visited in last year's fourth quarter.

Juan Moran, Meta4: Managing the unmanageable

Juan Moran, founder and ceo of Meta4, started his Madrid-based company back in 1991 to develop human resources software. The company is a typical start-up, with a revenue growth rate of 115 percent per year, generally healthy profit margins, and funding from General Atlantic Partners and more recently from Baan, the Dutch ERP company gone worldwide. (The investment is non-voting, and Baan is selling the Meta4 products on a nonexclusive basis. Meta4 wants to keep its independence.)

Moran understands that "knowledge management" is a squishy concept; better to focus on the people who create, embody and act upon knowledge. The company is now building a second-generation HR system devoted to managing humans as more than collections of credentials and benefits. To do that, it is building an underlying object-oriented foundation that represents employees (or contractors) and their skills, capabilities, needs and the like. Which employees could use what kind of training? Who has a background in contract negotiation? Which employees are working on a project that concerns power plants in Bukhara? The system is designed to manage information in the context of the people using it: Who gets to know about the bid on the WingDing project?

The overall technological creation looks like an application to customers, but in reality it is a platform plus components. With its own tools, it can be configured to work in conjunction with everything from security systems to accounting packages or collaboration tools. Says Moran: "Traditional business applications focus on the flow of money and goods. Now we want to focus on the people and knowledge dimension. Imagine a spreadsheet, with all its flexibility and manipulability, but for people and knowledge."

Correctly anticipating objections, he counters, "Yes, knowledge is only explicit knowledge; so far, all you can do is store and retrieve it like screws. How can you put tacit knowledge into such a system? There's no real answer, of course, but consider what the spreadsheet did for financial modeling: It enabled people with local knowledge — tacit knowledge — to express their assumptions. If you give people the tool to be their own knowledge managers, they will put more information into it, and it will be more meaningful. Each person should be able to combine his own information with anything across the organization." As the individuals' information interacts (rather than "is consolidated"), interesting patterns should emerge — everything from "market" valuations of skills that put a premium on knowledge of Java, to feedback that no one wants to work for the Western region sales manager (maybe someone should figure out why).

"How can you infer the presence of emergent knowledge?" Moran asks rhetorically. "We try to create conditions where it can happen, and then just assume that life will be created. We know we can't create knowledge, but we can at least look at it from outside: who wrote it, who used it, who would benefit from it, knowledge-sharing incentives. We look at free time as an opportunity to learn rather than as a waste."

He adds: "One of the biggest challenges in HR is the demand for flexi-bi-lity. People and knowledge management models vary greatly from one company to another, from one sector to another, one country to another. The system needs the ability to evolve as it is used."

Sanjiv Sidhu, i2 Technologies: Emergent orders

When we first met Sanjiv Sidhu, he had just left Texas Instruments to start Intellection, a novel start-up using UNIX workstations to schedule production lines. Managers could use the workstations and the underlying simulation/optimization tools to schedule and reschedule production on the fly in response to demand, pricing and supply conditions. That was in 1988.

Now, 10 years later, the company is called i2 and has 1100 employees who generated sales of $200 million in 1997 from customers such as Toshiba, Ford and Herman Miller. It now helps companies let their customers control production, albeit indirectly. The system lets customers and company production and sales facilities operate interactively, reducing the information barriers between customers and production that customarily produce inventory swings, inefficient resource allocation and poor delivery times.

Says chairman and ceo Sidhu: “Currently, most businesses avoid complexity because they just can’t handle it. If you do yield management (pricing products according to lead time) with a 2000-person sales force, for example, it’s very hard to keep them updated. It just doesn’t work in reality. Yet the complexity that businesses deal with will only increase.” He cites examples from the computer industry, but delicately refuses to name names, noting only the difficulties of moving from dealer distribution to direct sales over the Net. “How can you get the same efficiencies working through channels?” he asks rhetorically. “In the past, no one in mass production could afford to serve niche markets, but now everyone has to. Customers no longer feel they’re part of a mass market, they want to be served one-to-one. One competitor acts faster and the others don’t, with obvious results.”

What Sidhu finds most interesting is the tightness of the communication now possible between vendors and customers. The most immediate and noticeable impact is simply turnaround time, he says: “The response requirements, the expectations, are heightened when you remove those buffers. Before, the IBM guy would go out the door and say, ‘I’ll send you a proposal in a week.’ But that’s not acceptable anymore, even if you really could wait. It’s like eating the wrong way.” But more interesting — and supported by i2 — are deeper forms of collaboration, extending traditional EDI.

“For example,” says Sidhu, “suppose you and I are doing business and I ask for 100 As and 100 Bs. You could always get that order immediately using EDI. But suppose I can’t handle all that, and I decide to do 50 As and 50 Bs. You’d really rather just have 100 As, but how can you tell me? Now, you can send a model, with preferences and trade-offs, with your criteria for satisfaction. There’s no way a centralized system could manage all that, but if all my customers can express their wishes for themselves, I can essentially run a market-style optimization that maximizes everyone’s satisfaction — and my profitability.”

PANEL: THE ART OF MANAGING BOUNDARIES

Contracts establish boundaries. So do cost structures, domain names, content-rating systems, platform architectures, government treaties and customer-service policies. Many boundaries are under siege, notably those between customers and employees, companies and governments, for-profits and not, OSes and the Net, work and private life.

It doesn't have to be a siege, though. Some companies are exploring boundaries they or their customers previously considered inviolate and discovering that making them more permeable is good business. For example, consumer-oriented Web services such as GeoCities are beginning to offer busi-ness features. Its homesteaders can now run virtual offices or online stores.

The boundaries of a company's online presence are ripe for redesign, too. The most interesting online conversations about Toyotas may not take place on Toyota's Website. It may pay for Toyota representatives to be active participants in conversations going on elsewhere in cyberspace. A different angle: Customers used to be solidly outside a company's walls. Now customers perform various services for companies. The Net can be a full-time focus group, or even a development resource (as with Netscape).

Customer access is inevitable. How do you control it? Can you? Control issues aside, companies need to leverage the Net to create closer connections between buyers and sellers. Stockbrokers and their clients might use the Web to improve their interactions. After all, the Web isn't just for those kids in the back room who publish the corporate Website.

How will all this influence the legal fabric of rules, regulations and relations that governs vital parts of our economy, like financial services, and vital social policies, like protecting consumers and investors? What will it do to government, and what will government do to it in response?

David Bohnett, GeoCities: A Sense of (Virtual) Place

"The GeoCities model is successful because there are boundaries to the experience," says its founder, president and ceo David Bohnett. "Otherwise, the Web is a confusing and potentially intimidating place."

Bohnett rode the wave of technology mergers and acquisitions in the late 80s and early 90s — often as an acquisition victim — with Legent, Goal Systems and Essential Software. In 1994, he saw Apple's eWorld and was taken with it because it created a town with contexts for different activities. He saw an opportunity to advance the concept on the Web (if only Apple had!).

Users' writes

The major challenge for the startup he envisioned was editorial strategy: How to compete with major media companies that were bringing lots of money and well-known, established brand names to the Web. So he decided to give away free home pages with boundaries for behavior and contexts for interaction, which helped the model take off. AOL also offered free home pages, but it didn't add the rules and context.

Bohnett founded GeoCities in November 1994, created neighborhood names that evoked different themes (e.g., SiliconValley for hardware and software, WallStreet for investing and finance, Paris for poetry and the arts, and BourbonStreet for jazz and Southern culture) and had the service open for Web homesteaders in March 1995. By that October, it had reached 10,000 site owners. Now it adds that many each day to its 40 communities. GeoCities' 1.5 million homesteaders attract around 9 million visitors per month, making it one of the ten most visited sites on the Web.

More functions, more revenues

GeoCities has built a successful revenue model based on banner advertising and sponsorship, a fee-based premium service called GeoPlus, and electronic commerce relationships with companies including Amazon.com, CDnow, Egghead Software/Surplus Direct and others.

Until recently, homesteaders on GeoCities could set up Websites but do little else. They couldn't run their businesses on the site or earn money through it. That's changing, and quickly. Late in 1997, GeoCities struck a deal with Netopia (formerly Farallon) that offers any GeoCities home-steader a Netopia Virtual Office for $25 a month. Among other features, the Virtual Office offers a place on the Web to put a virtual business card (with photo), leave files for others or let others know when you're online.

This month, GeoCities announced GeoShops, which allow its members to publish a catalog of items for sale on their Websites for as little as $25 a month. GeoCities will register their domain names for a one-time fee of $100 and support unlimited e-mail accounts for those domains.

The premium offer, better still, integrates the Open Market transaction services platform and starts at $80 per month[2]. It includes order entry, inventory management and Taxware to help store owners calculate sales taxes and shipping fees. The shops are almost guaranteed to get traffic, because Geo-Cities is integrating information about the shops all through its environment. That's a long way to come from a simple homesteading Web service.

Jim Cashel, Forum One: Wanna talk online?

Three years ago, Jim Cashel was at the Eurasia Foundation, a non-profit organization that makes grants to foster civil society in the former Soviet Union (Esther is on the board and the executive committee). He saw the Net's power to allow communication among formerly isolated groups, but he also recognized that the communication technologies and accompanying search tools were still inchoate.

Then, the *New York Times* installed a discussion forum on its Website, which Cashel saw as a major brand legitimizing the idea of online conversations.

[2] *After a $125 setup fee, the transaction fee is the greater of $80 a month or $40 a month plus 5 percent of the transaction total. GeoCities will also help shop owners get credit-card merchant accounts if they don't already have them.*

He decided he wanted to help define and navigate that sector of cyberspace, so he founded Forum One Communications.

Besides a search engine for online discussions, Forum One offers consulting services to community groups online. Most of its clients are in the public sector, such as the World Bank, trade groups and development agencies. It also has some private clients, such as Advance Publications, which is part of the Newhouse empire.

One of Cashel's primary roles with his clients is dealing with information-age angst. Organizations are often uncomfortable with conversation technologies and certainly uncomfortable with the implications of ceding control to the communities they might create.

Online communities usually try to draw boundaries around themselves. Cashel finds it particularly interesting to see how the big brand names that have real-world property to worry about and concerns about brand image are dealing with issues of control in their online communities.

Studying the problem

Recently, Cashel chose the ten biggest brand-name discussion sites and inventoried their boundary-setting mechanisms. In particular, he noted whether and how sites explained their rules to visitors and took steps to manage their visitors' identities. He found a wide range of choices, from no barriers to entry and complete permissiveness, to highly restrictive sites that required users to "sign" a statement, use passwords and have their messages scanned by moderators.

He also found that pretty nasty stuff is being said in those places. People seem to have little fear of making racist, racy, sexist, libelous and conspiratorial statements. No surprise there, perhaps, but he was fascinated by the way companies were responding, partly due to the exigencies of getting traffic and despite the liability issues.

"Even the brands are erring on the side of permissiveness because they recognize that they don't have a choice," says Cashel. Site owners are walking a fine line. On the one hand, if they clamp down on the discussions, people leave. On the other hand, their need for traffic means they often set low thresholds of behavior, which lowers the quality of the discussions.

Overall, Cashel is hopeful. He sees the Web shifting from being a place to go for information to being a place to go to "do stuff." "The term 'online community' will disappear in the next 18 months," he asserts. "To define it as a separate activity will be meaningless." Now that's a boundary we'd be glad to see disappear.

David Johnson, Aspen Institute: Adaptive legal systems

Three months ago, David Johnson left Counsel Connect, the online meetingplace for the legal profession that he helped found, to run the Aspen Institute's Internet Policy Project (IPP). As Johnson explains it, "The Project will explore the development of self-regulatory mechanisms for the

Net. Recent activity around online privacy and governance of the Domain Name Service makes the case that governments ought to let self-organizing techniques work."

Johnson has been deeply involved in online privacy for years with the Electronic Freedom Foundation and other organizations, exploring the way the Net changes the nature of law. He is a founder and co-director of the Cyberspace Law Institute and wrote a guest issue of this newsletter with David Post, titled "Law and Borders" (see **Release 1.0**, 6-96).

A more recent paper of Johnson and Post's, "The New 'Civic Virtue' of the Internet," argues that entities with historic jurisdiction over important aspects of people's lives, such as local governments, may be completely ill-suited to creating regulations in the future. Instead, the social systems that arise on the Net are good examples of healthy adaptive systems.

Steve Wallman, The Brookings Institution: Dollars and sense

If you never understood why a stock market should quote prices in fractions of a dollar, you can thank Steve Wallman for spearheading the move to deci-mal prices while he was a commissioner at the Securities and Exchange Commission. Most of Wallman's energy over the past few years has gone into understanding the role that technology plays in changing market structures, particularly in capital formation, new product offerings, disclosure and trading.

Like David Johnson, Wallman sees the basis of law changing, albeit slowly. "We need law to have transactions, to ensure expectations are met," he says. "If the laws no longer accommodate the system, one or the other has to give. Nobody wants business advances to stop because the legal structures haven't caught up. Many things we won't be able to carry through because the legal structures will be too uncertain. It's unfortunate."

Some of these stresses show up in the securities business as restrictive rules. At the SEC, people needed advance written approval before they could send electronic information. The process was highly restrictive and not amenable to the Web at all. Wallman prefers goal- or intent-oriented regulation to the traditional command-and-control variety. Unfortunately few organizations are taking a positive look at this situation. Most of them are wondering how to stop the negative effects of cyberspace.

Wallman's horror scenario is thousands of mini-jurisdictions that check our every move. Prior to his term at the SEC, Wallman was a lawyer in private practice in Washington, DC, and a consultant with the Boston Consulting Group. He is a senior fellow with Brookings.

PANEL: LOOPS, LITERACY AND LEARNING

Feedback is an essential element of any learning system. It occurs at many levels and among many parties. A well-connected environment helps close many loops previously left dangling. Students' projects can connect with resources outside the classroom. Teachers can interact more regularly with parents. People who need to learn something can join forces to help one

another learn it. Companies can have real conversations with their cust-omers (whether they want to or not).

One feedback loop that seems to be broken is the one between the educational research community and today's training and knowledge-management offerings. One of the problems with most systems that claim to manage knowledge or create intellectual capital is that they ignore the activities that turn static knowledge into things that people know — many of which may not be expressible at all. The best projects and products for teaching children do a better job of creating such learning environments than most corporate offerings. Why the disconnect?

Brenda Laurel, Purple Moon: Comfort, not literacy

Purple Moon doesn't develop educational software. It's an entertainment company with a specific market — pre-adolescent girls — and a clear goal: to be relevant, engaging and fun. The research goal that drove the founding of the company was helping these girls get comfortable with technology in a way that will serve them well later in life. The company's founder and vp of design, Brenda Laurel, wants to do this by presenting girls with interactive characters and stories so compelling that girls will want to participate.

Comfort is different from literacy, a point that is altogether overlooked in the general market for children's educational software. "Comfort with technology," Laurel explains, "means being able to put your hands on a PC and not be afraid to break it. And when it does break, you blame the programmer, not yourself."

Purple Moon is one of the first three spinouts from Interval Research, where Laurel spent four years investigating the differences between how boys and girls used technology and what each group tends to enjoy. The key attractions for girls, she found, were situations that involved self-esteem issues and emotional and social challenges. "The biggest gift [we have] is understanding what engages girls and giving it to them in a way that honors them," says Laurel. "We've learned to listen well."

Products that resonate

Last September, Purple Moon released two CD-ROM "friendship adventures" designed for girls ages 8 to 12. "Rockett's New School" follows Rockett Movado through her first day at Whistling Pines Junior High. As girls follow Rockett, they face many of the decisions she would have to make. The plot changes depending on the choices they make.

"Secret Paths in the Forest" is a fantasy adventure in which girls meet seven characters in a secret tree house. In the course of their interactions with the characters, the girls discuss issues such as families, feelings and friendship. In the course of helping the characters solve problems, girls collect hidden stones that contain secret messages. Each CD comes with some merchandise, such as dolls, cards or other collectibles. Merchandising is a major leg of Purple Moon's business model.

Web popularity

The two CDs are doing well, but they haven't topped the charts yet. Purple Moon's Website is another matter. Launched only last September, it now gets over 150,000 visitors per month, of whom over 51,000 have become registered users. The site is attractive commercially, too. It has served 26 million pages so far and generates 6 million impressions per month, which brings it close to Disney's numbers. Girls stay on the site 35 minutes per session and they return: They average 1.5 sessions per day.

A key attraction on the site is the many characters who tell visitors about themselves and participate in new adventures that are plotted over time as richly as a soap opera. The site offers electronic postcards, and girls use them a lot. They have sent 2 million cards so far; 10 percent of the cards go to the Web characters, the rest to other members. Purple Moon monitors the messages.

Laurel explains the phenomenon: "We got the characters right. These are kids that kids recognize and want to know." In fact, she notes, these characters represent Purple Moon's collected intellectual capital. They contain information about the company's audience: What girls are like at this age, how they form relationships, what worries them and more.

Another important factor is the collectible, animated objects. In "Share Central" and the "Treasure Trove" (which currently runs a dream-vacation sweepstakes), girls can collect and trade these objects, some of which are scarce. For example, they can see what's in Nicole's purse (sponsored by Bonnie Bell's Smackers), including a coin bag, necklace, nail polish, brush and lipstick.

Purple Moon invested in object technology for the site; girls have to register to be able to download the objects and trade them by attaching them to the electronic postcards. Not surprisingly, girls are getting together online and arranging swap meets.

To honor and protect

The merchandising and talk of impressions raises the question: What's the proper boundary between merchandising and honoring? Laurel does object to assaultive, invasive advertising, but she doesn't mind product placements and sponsorships. "Products are a part of our lives," she says. "They fill our time. I don't have a problem with including things that kids are exposed to all the time. What's part of their world? We want to present information about the sponsors' products and services in a respectful way."

Purple Moon is growing, but Laurel doesn't want to show her hand. She sees the company as an entertainment business and soon hopes to extend the Purple Moon brand into a variety of new businesses. Her goal over the next five years is to make Purple Moon the leading girls' brand in popular culture, while continuing to make a positive difference in girls' lives.

Roy Pea, SRI International: Learning with distributed intelligence

Roy Pea recently joined SRI International, to grow a major Center for Technology and Learning, after five years at Northwestern University, where

he served as John Evans Professor and Dean of the School of Education and Social Policy. He also launched the University's Ph.D. program in Learning Sciences.

Pea also directs a new multi-institutional, NSF-funded Center for Innovative Learning Technologies (www.cilt.org). This Center is building new forms of virtual communities throughout the US that engage university and lab researchers, teachers and industry partners in harvesting and sharing what we know about improving learning with technologies, and pioneering the prototyping of new applications that build on best practices and leverage breaking technological trends.

Use of the "curriculum delivery" metaphor in educational settings and "distance learning" paradigms makes him shudder. "We know that meaning isn't clearly exposed in traditional teacher-centered education," insists Pea. "Discourse and highly-interactive conversations around building meaningful things is what frequently matters most," he says. "Slicing and dicing skills and concepts up in most formal teaching tears them out of the context in which they 'live,' and doesn't engage with the learner's driving questions on which learning must build."

His aim is radical improvements in learning, where new designs flip our assumptions about who can learn what, when. Interactive systems have opened up vast frontiers for new kinds of conversational props to support learning conversations. Some of his favorite examples include calculus learning through clown and elevator simulations among inner-city middle-school kids that outperform suburban high-schoolers (SimCalc), elementary-school kids programming robotic dinosaurs loaded with sensors (Lego Mindstorms), and networked high-schoolers throughout dozens of schools engaged in nuanced scientific arguments about global warming projections and outcomes in a UN-like forum with variants of scientific visualization tools and the same data used by the community of scientific practice (his CoVis Project-Learning through Collaborative Visualization, with colleagues at Northwestern). Such forms of "distributed intelligence" will become increasingly common with ubiquitous computing and networking.

Roy is a fan of the augmentation framework for thinking about the co-evolution of humans and tools that was developed at SRI by Douglas Engelbart in his seminal report 35 years ago, and that led to the pioneering invention by Doug's SRI group of many of the key innovations of personal computing, including the mouse, hypermedia, multiple display windows, shared screen videoconferencing, and distributed client-server architecture before the days of Xerox PARC.

COMPANY PRESENTERS

This year, we have 23 great company presenters. Eight of them are introducing their companies at the Forum, which makes them Debutants: dka, Elastic Networks, Kana Communications, Natrificial, OpCom, PostX, Quokka Sports and UpShot.

The company presenters follow a few recurring themes. Note that there is some repetition in the following list, since some companies illustrate several themes:

- abuzz, Kana, PostX and ServiceWare improve customer service and support.
- Kana and PostX show that e-mail is a power tool.
- abuzz, dka, Mirabilis and ServiceWare demonstrate different approaches to collaboration and offer some features of knowledge management.
- CrossRoute, Junglee and XaCCT are all “glue” companies; that is, they bring value by connecting a wide variety of systems that normally can’t exchange meaningful information.
- The Brain and Visual Insights offer wonderful new ways of visualizing information.
- Elastic Networks and iReady offer two paths to transparent, ubiquitous Net access.
- FreeGate and Software602 help put small businesses and branch operations onto the Net efficiently.
- Elastic Networks, FreeGate, iReady and OpCom all offer hardware products at a Forum that’s mostly software-oriented.
- Finally, IBM’s ethical hackers, Nortel spinout Elastic Networks and Lucent spinout Visual Insights show that big companies can still do creative things.

And now, on to their full descriptions!

ABUZZ: KNOWLEDGE MATCHMAKING

We first described abuzz in our second issue about market makers (see **Release 1.0**, 9-97). The company has since closed a round of $4.8 million in funding from Flatiron, Softbank, Solstice and Draper Fisher.

Its team has also done a lot of development work and thinking about the its offering’s design and market positioning. The simplest way we can describe their insights is that abuzz’s Beehive is a bottom-up, behind-the-scenes groupware system that helps make markets for knowledge.

It’s bottom-up because it allows people to visualize and organize their own knowledge networks — the networks of trust and influence that employees already use to satisfy their demand for answers. Through Beehive, these net-works can be scaled and distributed throughout and among enterprises. Users participate out of self-interest to be recognized as leading knowledge brok-ers and sellers within these knowledge networks.

It’s behind-the-scenes because abuzz is delivering more of the functionality through high-function messaging and groupware platforms such as Microsoft’s

Outlook and Lotus Notes/Domino. Beehive delivers routing and tracking services. When you want to communicate with someone in the Beehive system, you send e-mail to the Beehive server, and it figures out whom or where to send the message to. It's easier and more transparent than creating a new messaging system.

Local contact books, managed by Beehive, track the performance of each par-ticipant and supply the information necessary to visualize the knowledge networks. This approach allows Beehive to blend into existing desktop software. Individuals manage their networks by seeing messages and forwarding them. They gain good reputations in the system for answering things well. abuzz is trying to keep normal communications over e-mail separate from assigned tasks in its knowledge economy, which are worth points for individuals who complete them to their clients' satisfaction.

By the end of the year, abuzz expects to have two or three major client sites using the redesigned Beehive.

ATWEB: WEBSITE MECHANIC

AtWeb, founded in June 1996, has two main services: Register-It and Web Site Garage. The former service, AtWeb's first offering, is part of a crowded market of sites that automatically submit Website descriptions to search engines, directories, navigation sites and link aggregators. Register-It is the Web-promotion service used by AT&T WorldNet, Bell Atlantic, Best Internet, IBM's HomePage Creator, Macmillan Publishing and others.

The promotion service is competitive but not unique. The offering that caught our eye is AtWeb's Web Site Garage, which has a clear value proposition and makes the most of it. The Garage, launched in November 1997, provides for Websites the kinds of services that Jiffy Lube, Midas, AAAMCO and Tuneup Masters provide for cars, but the Garage isn't limited to specializing in one kind of service: It can easily wrap many services into its one Website. Quite a few sites now offer Net-based PC service, including Cybermedia's Oil Change, Tuneup.com, Symantec's Norton AntiVirus and CrashGuard (see **Release 1.0**, 10-96), but hardly any sites offer Website service.

"Drop" your site off at the Garage (actually, type in its URL), and the Garage's head mechanic will crawl the site and run a series of diagnostics on it, including its load time for various access speeds (from slow modems to T-1s), the number of broken links, the site's popularity (how many other sites point to it) and its spelling and HTML design. The site completely adopts the garage metaphor, which suits its purpose perfectly. Reports show up on clipboards handed to you by the head mechanic. They include suggestions for improvement.

AtWeb delivers the foregoing useful set of services for free, including registration on 16 major search sites. Registration on 100 sites costs $40; broadcasting a press release (via Business Wire) costs $80; submitting your site for various Web awards costs $100.

Then it sells two additional service packages for fees. The Turbocharge package combines free and commercial Web utilities to create a self-service solution. Most utilities cost less than $100; AtWeb collects a commission on the utilities bought through its referrals.

The Overhaul package is a full-service offering that puts consultants to work to repair the customer site. At $400, $700 and $1000, the packages include various parts of the service offering described above.

AtWeb will soon be adding more services, including browser compatibility checking; browser snapshot, which shows you how your site looks in different browsers, resolutions and sizes; a Hitometer, or visitor counter; Register-It Position Meter (RPM), to check where you rank in the search engine categories; and Register-It Readiness Check, which checks your site before you go ahead and register it.

Check yer oil?

Gautam Godhwani founded AtWeb with his brother Anil and two college friends, Thomas Knudsen and Peter Weck. Before AtWeb, Godhwani wrote software and managed software projects at HP, Microsoft, IBM and Texas Engineering Consultants. The company is privately funded and has been profitable since late 1997.

Web Site Garage is a great example of how companies are re-weaving the fabric of business: On the Web, it's easy to leave things at hand where it makes sense. AtWeb can add features to the Garage as quickly as it can develop them or partner with other companies that offer them. As people invent new Web service offerings, AtWeb can weave them into its one-stop-shopping site.

CROSSROUTE: A LOOM FOR THE NEW ECONOMIC FABRIC

Another example of the re-weaving of the fabric of commerce is CrossRoute. Its Alliance offering lets companies create inter-enterprise applications (it prefers "cross-enterprise") that automate many front- and back-office tasks by integrating those companies' systems directly to one another. (CrossWorlds Software, recently renamed from CrossRoads, does similar work inside enterprises.)

With Alliance, companies can exchange business documents such as manufacturing instructions, engineering change orders, product safety sheets, work-in-process reports and design drawings; integrate other companies' applications with their enterprise systems; send notifications to partner firms and control the timing of their interactions; create business logic that spans company boundaries; manage approvals; and link to external systems. These features lend themselves to many applications, including managing outsourced logistics, contract manufacturing, integrated distribution networks, vendor-managed inventory and just-in-time delivery systems.

Unlike the batch modes and single-task design of EDI, Alliance creates process automation that works with many applications at once and offers real-time access to information. CrossRoute takes advantage of the Internet, existing EDI and legacy applications, cryptography and distributed object technologies such as CORBA. Alliance is built in Java and includes a visual drag-and-drop application to build process flows.

Alliance uses software adapters to connect to legacy systems; customers can choose from a variety of formats suited to each interchange, from EDI to

proprietary storage formats. Alliance is designed to tuck in around systems such as SAP's R/3, but it works well with legacy applications, too. Cross-Route is working to develop the connectors to popular enterprise resource management packages from Oracle, PeopleSoft, Baan, SAP and others.

Building adapters

The process of creating adapters for important applications takes time, so early installations of Alliance will require more custom coding than later ones. Since each client company installs these systems differently, the custom coding never disappears, but it does shrink. Between 30 and 40 percent of each project's revenues are from consulting now. The system runs on Windows NT, with servers installed at each partner site; systems cost between $250,000 and $1 million.

Companies buy CrossRoute's system to act as a hub for their trading partners. The system price rises with the number of partners, each of which gets CrossRoute's software free, but configured so it only works with the hub that sponsored it. CrossRoute intends to follow those links and turn the partner companies into hubs.

Pilot project

CrossRoute's showcase customer is Adaptec, which has connected Alliance to its R/3 installation and to three of its largest suppliers. When an Adaptec employee places an order, it is logged in R/3, then Alliance pulls the order information, relevant engineering drawings and other documents together, wraps them into an encrypted object and ships the bundle to the appropriate supplier. The supplier then acknowledges receipt of the order and communicates any errors — all through Alliance.

Ken Ross, CrossRoute's president and ceo, is a serial entrepreneur. In 1972, he founded Ross Systems and grew it into the largest vendor of DEC VMS-based financial software. He sold it in 1988, started consulting and eventually became ceo of Documentum. Then, in 1991, he joined Pillar Corp., a vendor of enterprise budgeting software, and took the company from $1 million in annual revenues to $10 million. Ross sold Pillar and eventually joined Enterprise Integration Technologies (EIT; see **Release 1.0**, 10-97), where he met CrossRoute's other founder and technical architect Greg Olsen.

Olsen had been working for years on collaborative computing and the use of networks to support manufacturing, procurement and engineering design activities. Ross and Olsen began to combine ideas, from which Olsen created peer-to-peer workflow models that allow for private processes to work in concert with public processes that underlie Alliance. They founded the company in April 1996 and have raised $8.5 million to date from Bay Partners, Telos Venture Partners, Ziff Brothers Investments, Piper Jaffray Ventures and private investors. CrossRoute now has 50 employees and a lead role in helping companies to build tighter, more productive links to one another.

DKA: MAKING A SCENE
Debutant

When we first wrote about dka last December, the company was developing its offering, sceneServer, for knowledge management inside corporations. In

that vision, sceneServer would help workers design and share their points of view, cull significant information and participate in conversations around those items — all through easy-to-use, dynamically generated Web pages.

That market is still important to dka, but the company's six founders have tapped into a different market they think is at least as interesting (and profitable, of course): customer intimacy. How, they have been asking, can sceneServer help organizations develop a sense of intimacy and trust with their customers and prospects?

dka's team believes that "scenes" will become one of the primary ways individuals use and navigate the web to manage their online relationships and benefit from others' contributions and perspectives. Scenes blend conversation, content and commerce. They can also generate subscription and transaction revenues, as well as offer targeted message delivery to enhance brand awareness and image.

This idea isn't really about publishing big, mass-market Websites. It has smaller scale, though it grows large in aggregate. It's easy for us to envision white-collar workers everywhere managing "scenes" themselves that host five to 20 people in private virtual spaces. A financial services company could sponsor private investment clubs, which manage their portfolios through scenes.

Along with coo Marc Landsberg and the other co-founders, ceo Tim McDonald is adding features to sceneServer to support transaction services and multiple subscription models. In addition to its current, traditional licensing model, public servers might offer private scenes that small and large busi-nesses can sponsor for their clients.

ELASTIC NETWORKS: YOUR LAN ANYWHERE
(An independent unit of Nortel)
Debutant

One of ISDN's major weaknesses is its lack of consistency. You can't take a machine configured properly for one ISDN connection, plug it into another ISDN socket and expect it to work — never mind taking it to another region where the ISDN service is delivered by a different phone company. There's nothing transparent about ISDN.

Modems are more transparent, as long as you know your service provider's local access numbers, whether or not to dial a "9" to get through a PBX, and so on. They're also slow, slow, slow. All the higher-speed connections such as T-1s are even less portable than ISDN and modems. Wouldn't it be nice if you could have your high-speed LAN connection from work operate in many other places?

That's the premise behind Elastic Networks, an independent unit of Nortel that wants to populate many semi-public places such as hotel rooms with gear that allows visitors to plug in their Ethernet cards and pretend they're at work (or at least enjoy the bandwidth they have at work).

Elastic Networks' technology, EtherLoop, works over standard copper twisted pair and provides high-speed access similar to that of the highest-speed

ADSL (Asymmetric Digital Subscriber Line) approaches. The twist is that EtherLoop and its accompanying software make plugging into a foreign connection a completely transparent experience. No messing with system settings. No special software on your PC. If your PC is configured to use an IP network already, you can plug it into an Elastic Network and connect.

Elastic does this by automatically detecting and proxying your computer's request for its home network with the Elastic Internet Proxy (iProxy). iProxy works even when the PC has a permanently assigned IP address.

Connection points everywhere

Picture smart videotape-box-sized access units mounted on walls at table height in hotel rooms, classrooms, airport lounges or anywhere you find a pay phone. Elastic Networks is experimenting with many ways of making the devices available in many public and semi-public places. Pricing isn't set yet, but the company has wired the PC Forum's outside access room with EtherLoop technology. Bring your Ethernet plug to the Forum and try it out!

FREEGATE: TURNKEY ACCESS

Few small businesses have the expertise to make the hardware and software choices to connect themselves to the Net, let alone to deal with the complexities of Web publishing, e-commerce and extranets. Similarly, few branches of larger companies have full-time tech-support people who can install and troubleshoot such gear. Last September, a startup called FreeGate announced first shipment of its Multiservices Internet Gateway (MIG), a turn-key system in a rack-mountable, 10-pound box.

FreeGate's engineers made many good design decisions that make the MIG simple to install and administer, a good value and more reliable than competing turnkey products. The MIG's broad array of software includes many time-tested freeware products, including Free BSD (a public-domain version of Unix), the highly popular Apache Web server, e-mail (Qmail freeware), a tightly integrated IP router and firewall, and domain name service.

The team included plenty of redundant hardware: mirrored disks, dual fans and a built-in UPS, all easy to replace in the field. The MIG's modem lets administrators log in from anywhere and troubleshoot the system. It includes key-management technology from Sun and SSL (Secure Sockets Layer) from Terisa. The MIG is fully internationalized, including a complete Japanese user interface.

Just let it run

FreeGate's latest feature, an extra-cost option ($1000), is a virtual private network service that lets companies configure sites that are physically separate to act as if they were on the same LAN, which makes the MIG ideal for companies with many branches or for extranet applications across partnering companies. A remote-user VPN package that supports road warriors and telecommuters costs $600. The systems support automatic software upgrades over the Net and will soon support added-value services available for purchase on FreeGates' Website.

The three models of Multiservices Internet Gateway vary primarily in their connectivity options (there are a few drive and memory options). The base models offer ISDN or 56-Kbps Internet connections and cost $5400. The fractional or full T-1 unit costs $6800. FreeGate's most visible competitors are Whistle Communications, i-Planet and Cobalt Microserver, each of which is positioned somewhat differently.

The MIG is designed to support between 20 and 200 people. So far, most customer installations have fewer than 50. MIG customers can use any ISP. In fact, FreeGate expects ISPs such as UUnet to become its most significant channel. Today it relies mostly on VARs, where a joint marketing agreement with HP has been invaluable; it recently struck a deal with PacBell to resell the product.

Jean Gastinel and Jean-Marc Frailong, previously with Sun and Xerox, respectively, founded FreeGate at the end of 1995. Brentwood Capital not only helped seed the money, it also sparked the idea for the company in the first place. Other investors include Accel, Integral Partners and AT&T Ventures. Now FreeGate has over 60 employees, some happy customers and a new release in beta.

IBM RESEARCH: ETHICAL HACKING

(see description of Charles Palmer, page 9)

INVENTION MACHINE: FROM RUSSIA, WITH LOVE

Researchers and product developers can do all the out-of-the-box thinking, Outward Bound courses and conceptual blockbusting they want, but sometimes what they long for is a savvy partner to puzzle through the logic of their predicament and offer useful, specific suggestions that might never surface unaided. What if the savvy partner were a software package that contains a knowledge base of thousands of physical, geometric and chemical effects spanning numerous fields of engineering and science?

Invention Machines has developed two software products that fit this bill: TechOptimizer and IM-Phenomenon. The applications, designed for use by engineers, can help companies solve problems, save time and money, and create new intellectual property.

The products

Invention Machines' products have evolved over time. Its first product, IM-Lab, was based on the Theory of Inventive Problem Solving, created by Genrich Altschuller in Russia. Its second product, TechOptimizer, helped engineers correctly state their engineering problems while working with IM-Lab to solve them. These two packages were combined into TechOptimizer 2.5 in June 1997.

Last December, Invention Machine introduced a new concept-generation and technical knowledge-management product called IM-Phenomenon. It works with TechOptimizer in the conceptual stage to create a full tool set for product and process development.

You don't have to be a NASA engineer trying to find a new say to steer a satellite or a pharmaceutical researcher trying to discover new ways to mix liquids to appreciate Phenomenon's depth and usefulness. The program, which comes on a CD-ROM, has a technical knowledge base filled with over 1000 effects, such as the Coanda effect, which deflects gas or liquid flow in a number of applications, from airplanes to teakettles.

On the left side of Phenomenon's display is a list of effects, carefully categorized and presented in an Explorer-type list. Each effect has a description page, shown on the right, which contains advantages, disadvantages, limitations, formula examples and references. Most effects have simple but effective animations to help clarify how the effects work. The system also supports links to resources outside the application, including Web searches.

Innovation mill

Browsing the effects is fascinating, but the payoff comes when you invoke Phenomenon's AI engine to create logical sequences of effects that achieve a desired result. The program can also offer a variety of options to achieve a given effect. Because of the system's breadth and depth, it can create novel combinations of effects that individual researchers might not have discovered. An obscure effect reported in a specialty journal from a little-known discipline might be just the link needed to solve a complex problem.

Invention Machine calls this process Computer-Aided Innovation. The ref-erence to Computer-Aided Design is intentional: CAD tools are used to design products that might be conceived with Invention Machine's tools. The downstream processes such as design and assembly have been largely automated or enhanced with task-specific software, but the upstream processes haven't. Invention Machine offers a technology boost for the creative process.

Discovery machine

Users can also create their own effects and add them to Phenomenon. Perhaps more interestingly, Phenomenon can analyze a company's patent portfolio and match it against its list of known effects, effectively reverse-engineering the kinds of physics or chemistry that the company is relying on most and perhaps uncover some effects that haven't seemed important yet.

Invention Machine had over $10 million in revenues from all its products in 1997, more than double what it brought in the year before. Its customers include Jet Propulsion Labs, Motorola, Mitsubishi, Becton Dickinson, Kodak, Ford Motors, AlliedSignal, Procter & Gamble and General Motors. A single-user license of IM-Phenomenon costs $2500, which includes maintenance and a one-year subscription to new effects. TechOptimizer costs $7500. The company's initial funding of $5 million came from Travelers Group in September 1996; additional rounds have come from RRE Investors in New York and Altamira of Canada.

IREADY: EMBEDDING INTERNET CAPITAL

PC users are beginning to take for granted that their computers can be — and eventually will be — connected to the Net. That's not nearly as true for other devices, particularly small, inexpensive ones. TVs may be on the road to Internet connectivity, but game consoles, cellular phones, pagers and similar devices get connected to the Net only with awkward and inefficient combinations of PC-legacy modems and software, and usually not at all.

What if someone were to design a solution specifically for these markets? That's what iReady has done with its Internet Tuner design core, which lets consumer-electronics manufacturers embed an inexpensive and efficient set of Internet capabilities into their devices.

The Internet Tuner has a scalable architecture with sub-modules that provide the functionality of various Internet protocols (e.g., the communication protocols TCP/IP and PPP; e-mail protocols SMTP, POP3 and IMAP4; Web proto-cols HTML and HTTP; and image formats JPEG and GIF). Companies that license the Tuner technology choose from these features and use only those that their applications require. Need a Java pager? No problem. Don't need Web browsing capabilities? Don't order them. Future versions will include support for streaming media and dynamic data, including Java.

Terms of the trade

iReady doesn't make or sell circuits; it deals in their designs and gives its customers silicon-module designs that they can add to more complex ASICs (Application-Specific Integrated Circuits). By optimizing its designs for Internet connectivity and throwing all excess code overboard, iReady's solu-tions can be far less expensive and inefficient than solutions adapted from the PC realm. That makes it easy to envision Net-enabled toys, DVD players, TVs and eventually cash registers, gaming machines and medical devices.

Toshiba has licensed iReady's technology to create ASICs for general sale and to add Internet functionality to products it is developing. The company just released its second-generation Tuner, the i-2000, which another major (as yet undisclosed) consumer-electronics company has licensed already.

iReady was founded in January 1996 and has raised $8.5 million from Telos Venture Partners, Canaan Partners, Jafco, RWI Group, Sand Hill Financial and private investors. Its founder, president and ceo, Ryo Koyama, previously worked at Media Vision, which creates multimedia products for PCs. That's where he met and worked with his co-founder, John Minami, who was the design manager for audio controllers. The two had worked together previously at Everex.

Koyama was especially familiar with consumer electronics because he had sold all too many of them to put himself through a fluid dynamics major in col-lege. Years later, while talking with a friend, he realized that as things got more connected over the Net, a consumer-electronics analog of the cable-ready tuner made sense. He bounced the idea off Minami, who agreed. Now iReady has 30 employees and is on a steep growth curve. Koyama expects to see products that use his technology on the market by the end of this year.

JUNGLEE: WEAVE YOUR OWN CANOPY

The Washington Post's Ralph Terkowitz, a longtime Forum attendee, loves Junglee. The company's product, Canopy, allowed the Post to whip together its CareerPost classified-ad application much faster than it would have taken had he gone through the normal programming cycle.

Junglee's Virtual Database technology, developed by its founders during their doctoral research at Stanford University, maps to Websites and databases, then adds logic that makes it possible to extract information from them and merge it into a single, virtual data store. It's a relatively simple way of tapping into legacy systems everywhere and making them available on the Web. It also closes an important loop by connecting database-driven Websites to applications that can use the data.

The company's first market is classifieds, especially job listings where it has done well so far. Over 35 newspapers and other high-traffic sites already use its JobCanopy to publish their online classifieds. These sites also connect to over 400 employer sites to collect job postings.

Extractions that don't hurt

One of Canopy's core functions is linguistic feature extraction, which gives it the ability to follow links and formats down to key information in unstructured text, which it then puts in its own data store. That's what makes it possible to capture and compare job postings from sites that publish them in completely different ways. To that function, Junglee adds data validation, flexible querying and other features that make the virtual database quite powerful.

Junglee's market is certainly not limited to classifieds. The company's next target markets are retail, financial services and (later) enterprise applications. With ShopCanopy, Junglee helped Yahoo! create the Visa Shopping Guide, which integrates information about books and music CDs from various online services.

As Websites use XML and other standards to add semantic information to their now-naked data, Junglee will benefit, too. The company is working closely with the standards bodies and core developers to create new functionality around XML.

Junglee was founded in June 1996 and has raised $11.6 million so far from investors, who include The Washington Post Company, Kyocera, Nichimen and TransCosmos. The company's president, Rakesh Mathur, founded two other Silicon-Valley companies prior to Junglee: Qixel, a multimedia semiconductor company, and Sona Computers, an early (1983) portable PC vendor.

KANA COMMUNICATIONS: FAST, PERSONAL SERVICE
Debutant

One of our favorite newspaper articles described an experiment in which the writer had tested the responsiveness of two dozen corporations that published e-mail addresses on their Websites (*Wall Street Journal*, October 21, 1996, by Thomas Weber). Of these companies, nine never responded to an e-

mail query he sent them, half responded with an automatic acknowledgement but took a month to reply to his question, and only three — LL Bean, Whirlpool and Ford — responded right away with an authentic answer.

If he ran the survey today, in our experience the statistics would be little improved. This is astonishing at a time when customer relationships have found their way to the top of the list of strategic management issues. Kana Communications offers a system that not only addresses this problem, but also takes full advantage of the opportunities it presents and helps employees act in unison to offer consistent, accurate messages.

Companies receive e-mail from many places: Their Websites have forms that generate mail; they also publish their Webmaster's addresses and others such as sales@yourcompany.com and info@yourcompany.com. In a Kana installation, all these messages get forwarded to Kana's Intelligent Message Agent, which stores the messages and puts them in an Active Message Pool, where it analyzes them and assigns them to queues for processing.

Call center plus

Yes, this sounds like a text-based call-center application, with Kana's server playing the role of an ACD (Automated Call Distributor), but there's more to Kana's offering than that. First, e-mail offers a lot more information to analyze than a phone call does, most notably the full text of the writer's question; second, Kana's system is designed for use by many people inside a company, not just one dedicated group. (Good news: The customer does the work of data entry!)

Kana's offering uses a standard relational database back-end, an application server (written in Java) and Windows client software (written in Visual Basic) for agents. A core set of people will have Kana's client software loaded, but the system knows how to include other people (and their e-mail clients) seamlessly. Kana's server tracks the responses and re-addresses or reformats them so they look consistent before they are sent to the customer. It can also acknowledge messages automatically and escalate messages from its queue as they age.

Kana's system is carefully crafted to make the operator's time effective and nurture the customer relationship. It begins with getting the customer to the right person quickly, which Kana does by combining the system's automatic suggestions based on key words with an easy way for operators to categorize and route inquiries based on a shared category hierarchy.

The system automatically recognizes repeat contacts and can retrieve all their prior interactions. It also recognizes that communication gets more casual as the parties get to know one another, so it offers pick-lists with a variety of salutations, greetings and closings. Representatives can edit the messages directly at any time. The display shows the work queue of incoming messages, the current message and the current response-in-progress, along with buttons and pick-lists representing many useful functions and shortcuts.

Futures and past

Kana's engineers included spam filters on the server and ways of handling attachments so they are available to all representatives. The system also

has strong performance reporting (integrating the market-leading Crystal Reports) and administrative utilities. In the future, Kana will make more use of automation, documented APIs for integration, HTML mail and so on. It can also integrate ads in the responses or exploit cross-selling opportunities. There are many useful directions the system could go. We know we'd love a subset of these features as an add-in to our own e-mail client.

The idea to start Kana came to Mark Gainey in 1996, when he was thinking about starting an Internet sporting-goods service. When he talked to owners of such sites, he was struck by the big brand-name sites' common complaint that they couldn't handle the flood of e-mail they were getting. Draper Fisher Jurvetson led his initial funding, and David Beirne of Benchmark Capital led the second round, for a total of around $5 million. Gainey was himself in the venture business, having spent five years at TA Associates in Palo Alto. Kana, by the way, is the name of Gainey's dog.

MIRABILIS: VIRAL MARKETING PRO

Last June, we wrote about the transformative powers of buddy lists (which are sometimes described as instant-messaging systems or pagers). We fully expect buddy lists to influence the future design of telephones and whatever communication interfaces/devices replace them — if the buddy lists themselves don't actually take over that role.

Also, buddy lists are creating new forms of online intimacy and presence. We don't mean cybersex, though that's undoubtedly happening, too, but rather that seeing someone's name on a buddy list offers a different sense of their being at hand. The lightweight, casual nature of instant messages makes them more intimate than e-mail and other communication tools, too. Of course, the telephone remains the king of electron-mediated intimacy. How else can you get that close to almost anyone's ear?

Zooom!

One of the fastest-growing and most feature-rich buddy lists on the Net is Mirabilis' ICQ (a play on "I seek you"), which now boasts over 8 million registered users and regularly hosts over 400,000 concurrent users. Despite not being a destination site (yet), Mirabilis regularly scores in the top ten most-visited sites on various services' scoreboards.

Head for Mirabilis' Website, and you'll see an amazing number of features that the company has put there, including:

- User lists based on topics, effectively creating ICQ chat rooms;
- "Pager" control panels people can (and do) put on their Websites to make themselves easier to get in touch with;
- Personal pages automatically generated for each user that allow non-ICQ users to ping users;
- An ICQ plug-in API for developers;
- A search engine to see if someone you know is on ICQ or to find a discussion group on a certain topic; and
- Instructions on how to use ICQ to drive voice and audio applications.

A recent site redesign makes this profusion of features easier to cope with, but it's almost too much. ICQ's core functionality gets obscured in the flurry of activity. That said, the site is also a monument to its owners' creativity and the service's power.

What now?

The buddy-list market has been moving. Others have entered the market, including Yahoo!'s Pager and MSN's Friends on Line. Microsoft also proposed a buddy-list standard to the IETF and later bought the business-oriented buddy list developer, Flash Communications.

Amid all this, Mirabilis still isn't charging for its services, isn't taking advertisements and hasn't been bought by any of its potential suitors. To us, what Mirabilis has built is at least as valuable as Hotmail, which Microsoft recently bought for what sounded like a steep price. What will Mirabilis do next?

MIRROR IMAGE: WASTE BITS, NOT BANDWIDTH

When many people share a common Internet access point, as happens for companies and for ISPs at each of their points of presence, they end up going to many of the same sites. Instead of hauling all the bits from those sites across the entire Internet each time someone needs them, it sometimes makes sense to put caches at those access points and save some time and money. Caching is also viewed by most ISPs as a necessary enabler for audio and video over the Internet.

Several companies have stepped into this space with hardware solutions such as CacheFlow. Mirror Image, based in Sweden, entered the market with the innovative concept of transparent caching, which requires no adjustments in the end-user's PC settings[3]. Most caches require that someone point the browser to them explicitly; Mirror Image's doesn't.

In early 1997, the company raised $5.5 million in a Swedish public offering, which helped it get products into the field to both ISPs and corporations. It turned out that transparent caching was more difficult than expected. When Cisco launched a similar product last fall, it had to recall all the units and relaunch six months later.

It's an iceberg!

What distinguishes Mirror Image from its competitors is that its ceo Sverker Lindbo and the rest of its executive team realized that the separate hard-

[3] *As you may note from its name, Mirror Image Began as a mirroring-system vendor. In mirroring, content providers push their information to distributed sites so that a single server won't be flooded with all the traffic. Caching demand-driven. If Web surfers don't surf, there's nothing in the cache; when they do surf, the cache just stores the data until the disk is full, when it deletes files that no one has requested for some time. Caches let requests for dynamic page content pass through to the sites. Mirror Image switched to the cache model early on, but its name stuck.*

ware cache market is likely to be dominated by the major router, firewall and gateway vendors as they include caching capabilities in their products.

As a result, Mirror Image has been turning itself into a highly flexible service company that will compete on the basis of advanced technology it has developed, such as shared caching services, the ability to work with all content and ensuring that no stale data are kept in caches.

The shared caching is especially interesting: Mirror Image deploys large central caches at key Internet exchange points, where they serve as commu-nity content servers. Nearby ISPs and businesses all share the caches and the benefits of scale. The company has now made deals with some of the major hardware vendors about adapting their products to the Mirror Image service.

NATRIFICIAL: BRAINS ON FIRE
Debutant

The Brain, which we first described in December 1997, remains the best, most carefully crafted piece of software we have seen in the past year. It offers a simple, powerful concept-mapping model slipped into a lightweight utility that's always at your fingertips.

In the few months we've had a Brain, we've put 3200 thoughts in ours and haven't touched the bookmark files in either of our browsers. We've also started using Windows Explorer less. During conference calls, we often find ourselves weaving links around our conversation. That is, we put the person we're talking to or the company she represents into context in our Brain. Everyone won't react this way to The Brain, but this is not a niche product.

Since December, Harlan Hugh, the brain behind The Brain, has not been idle. He has added many features to his creation, the latest of which include Brain publishing (your Brain is uploaded automatically to Natrificial's Website to be available to others), automatic Web crawling (the Brain creates a thought for each Web page; you specify search depth) and enhanced e-mail and browser support.

Hugh's vision for future Brains includes broader network support and multi-user Brains. Since Natrificial put its software on the Web for trial use (after 30 days, your Brain won't accept new thoughts unless you pay the $50 license fee), downloads have jumped to 15,000 per month.

OPCOM: SCREENS THAT SEE
Debutant

In the market for monitor-sized flat-panel displays, a half-dozen technologies compete for dominance. The current favorite is the TFT (Thin-Film Transistor) active-matrix LCD (Liquid Crystal Display). Active-matrix LCDs offer a bright, crisp display with few annoying effects such as ghosting (when the image doesn't fade quickly, so moving objects leave trails) or submarining (when your cursor disappears while in motion). But active-matrix LCDs are power-hungry and expensive, and they're difficult to manu-facture in large screen sizes.

The first value proposition of the technology that OpCom (the Optoelectronic Component Corporation) has developed is that it can create displays with the same performance characteristics as active-matrix LCDs, but at half the cost and with half the power requirements. The technology is still in the proto-type stage, though, so a little skepticism is in order.

Because OpCom's system consists of small, square panel elements that fit together like tiles, it is easy to assemble in arbitrary sizes, including large screens for TVs. Now that's more interesting.

The second value proposition is the doozy. OpCom's displays can also act as still or video cameras. That's right. They're bi-directional. The same surface that shows you an image can capture yours, effectively turning the screen into a two-way window for videoconferencing, for example. The displays can also detect motion and color.

When they hit the market, displays (displays? what should one call them?) using OpCom's technology should resolve one of our beefs with today's videoconferencing technology: Because cameras are always mounted next to displays, people using the systems never get the feeling that they're really looking at one another. Also, the cameras and extra wires are obtrusive.

Put on your beanies!

Here's how OpCom's Virtual Window technology works. Screens are built to whatever size is desired out of integrated circuits that are 16 mm square and roughly 4 mm deep (a finished display would be about 10 mm thick). The surface of each chip has a shutter system made of ferroelectric LCD material. The shutter openings are controlled electronically at very high speed to allow light out — and in — as needed.

Under the shutter layer is a layer of optic fibers that are notched in a way that makes the notches act as mirrors, bumping light from microchip laser light-emitting diodes out of the optic fibers at the right places. The shutter system makes sure the pixels show up at the right times. The notches also bump ambient light into the fibers, where it is received by minute light detectors.

Image capture and video processing are performed during the video refresh cycles. The underlying chip technology is well-understood CMOS (Comple-men-tary Metal Oxide Semiconductor), which means the chips could be built in conventional IC foundries.

OpCom's technology has been under development for eight years, at a cost of $4.5 million from private investors. The company's cto is Norwegian Kjell Hansen, a former military weapons lab director and an expert in Charge-Coupled Devices (CCDs — the technology used to capture light in digital cameras, among other things).

Now the team is consolidating in Seattle and looking for $3 million in funding to take the project to the fully functional prototype stage. Carlos Mendez, the company's president and ceo, worked on various military weaponry and image-targeting projects as an independent consultant. Now he has a really big target in his sights.

PLANETALL: NETWORK PIM

Over the past decade, Warren Adams has spent quite a bit of time in Europe, first studying at Freiburg University in Germany's Black Forest, then at a management consultancy in London. Since his undergraduate days at Colgate, he has marveled at how difficult it is to keep in touch with all the people you want to stay close to in your business and personal lives. At the time, he dabbled with creating an interactive contact-management database, but shelved the idea.

Eight years later, while attending a college reunion in the US, at least 15 people said, "Gee, I wish I had known you were in London; I was just there and would have looked you up." Adams saw the Net as the ideal medium for a service that would fix this problem, dusted his idea off and started PlanetAll.

The service is full of great ideas, including periodic e-mail notifications of your contacts' address changes, friends' upcoming birthdays and a "crossing paths" section that tells you of contacts who will be visiting your city soon. One of our favorite features on PlanetAll is that it is the only Website we know of that lets ordinary people create and run mailing lists (similar to Listservs) for free.

Note that knowing about birthdays and travel plans lets PlanetAll do extremely specific ad targeting. When it puts a link to Greet Street's electronic postcard site next to the names of contacts with upcoming birthdays, it gets 15 percent click-through. When it knows you're going on a trip, it targets travel and gets 18 percent click-through. For graduations, it could suggest gift ideas and so on.

Taking off

Launched in the fall of 1996 with a quickly designed Website and database, PlanetAll found an interested audience but grew slowly until around October 1997. Then the site's idea started to get traction, especially as Planet-All closed OEM deals with major Websites that turned PlanetAll into the engine behind its partners' offerings, much like Classifieds2000, Vicinity and other services power the specific features of many of those sites. PlanetAll is the GeoPlanet inside GeoCities, the People Network in the Monster Board (of jobs) and the Personal Address Book inside Infospace. One of the major search engines is about to launch a PlanetAll-run active address book.

Now PlanetAll has 29 employees and is just crossed the million-user mark, with over 10,000 users joining each day. Adams has hired a ceo, Jim Savage, who formerly ran ZDnet and is eager to make a small company large. Planet-All's first round of $5 million was led by CMG @Ventures; it is now in the middle of raising its second round.

Currently, PlanetAll's principal revenue source is technology licensing. One vendor that offers a universal messaging system pays PlanetAll a fee for each user mailbox for a system that is expected to grow to cover 3 million users in its first year. Corporations are licensing PlanetAll's technology for internal use. Package-shipping companies have been especially interested in having up-to-date addresses.

Affinity groups such as university alumni organizations are a third major customer segment. PlanetAll has 70 associations signed up now; it gains two or three new ones each week. Alumni organizations are especially appealing to advertisers because they are typically well-defined, well-heeled groups.

PlanetAll also counts on revenues from e-commerce and advertising, but mostly through partner sites. The top 20 sites get much of the traffic on the Web, and PlanetAll gets a share from the traffic it brings the sites it works with. Adams expects to add premium services to PlanetAll over time, such as personal communication assistant services, special PDA/PIM synchronization drivers and a change-of-address service.

Making it easy

One of the early problems with PlanetAll was getting people to put their contacts' names into it. Even people who had well-kept private databases had to retype the information into PlanetAll. Recently, the site launched a test synchronization application that works with Microsoft Outlook (97 and 98). PlanetAll's engineers are working feverishly on synchronization with many other PIMs, including the PalmPilot, Symantec's ACT, Lotus Organizer and Outlook Express.

It's possible to envision small businesses eventually outsourcing their customer databases to PlanetAll and synchronizing locally only so they can move about with laptops and handhelds. PlanetAll becomes a self-populating, network-based PIM that features proactive notification of your friends' and professional contacts' activities and even helps you run online conversations. It's a great idea.

POSTX: SPECIAL DELIVERY!
Debutant

Despite the mad rush to build Websites and the furious development of transaction systems, e-mail is still the most ubiquitous technology on the Internet. Unfortunately, for a variety of reasons, e-mail has remained quite primitive. Unless you're in a closed corporate system that uses the same e-mail technology, it's hard to use advanced features and you can't be sure the person you're sending to will be able to enjoy those nifty features. What you get is plain ASCII messages.

Outside cyberspace, companies spend billions each year to create, print, stuff, mail and process offers, bills and other kinds of correspondence. The more important of these messages travel via First Class mail, which has long been considered safe enough to transport personal information such as your bank balance, medical test results or checks.

PostX Corporation has created First Class business e-mail. Its offering, the PostX Envelope System, includes components to aggregate content, personalize it and secure it in interesting envelopes; customization software to get the envelopes to the right people; and client applets to "run" the messages on delivery, as long as a Java runtime is available.

For users who have no Java runtime, the system also supports Web pages and plain ASCII messages, but its functionality decreases rapidly without Java.

For example, only the Java version supports secure envelopes and automatic receipt acknowledgements. PostX is counting on the rapid proliferation of version 4 or better browsers, which have the runtime built in already.

The company's ActiveView technology provides the interactive capabilities to capture responses from the recipient. These responses are also e-mailed back to the response-management component in the PostX Envelope System.

Smoothing the ride

The PostX Envelope System can customize messages to large numbers of recipients. Envelopes can contain applications, business forms or files. Every customer can get a bill printed in a style suited to her age or tastes, alongside ads similarly customized. It also enables payments, as well as linkages to personal financial management applications.

The Envelope System is not designed for spamming hundreds of thousands of users, but rather for putting the right touch on each of thousands of messages to customers and prospects.

"Venkat" Venkatraman, the company's founder, sees two main uses for the PostX system. The first is enabling business processes such as bill presentment, even t-based alerts or trade confirmations. The second is ongoing promotions and customer-loyalty programs such as airline travel promotions to frequent flyers.

Prior to founding PostX, Venkatraman was a senior engineering manager at Apple, where he worked on the mail and messaging systems that were part of System 7.5 and the PowerShare servers. He also helped define the Vendor Independent Messaging protocol. The company is funded by private investors.

QUOKKA SPORTS: BE THERE!
Debutant

In 1995, Alan Ramadan was the founder and technical director of the Australian America's Cup Challenge. Race officials and syndicates tracked the boats' performance with technology from Fluid Thinking, which monitored 40 variables per boat and presented the information on computer screens in real time. From his post on the mothership, which collected all the boats' information, Ramadan noticed that the display was as compelling to watch as the real event, because it offered so much more information than you could collect through direct observation.

That summer, he went to Stanford University to participate in its Executive MBA program. The Internet was hot, and it didn't take him long to come up with the business idea of what he now calls "total sports immersion." Think of it as Internet cybercasting on steroids.

In a few months, Ramadan had founded a company with John Bertrand, winner of the 1983 America's Cup and Dick Williams, formerly ceo of Illustra and Digital Research. Ramadan named the company after a rat-sized, kangaroo-like marsupial called the quokka (found only on Rottnest Island, off the coast of Australia) and chose the Whitbread Round the World Yacht Race as Quokka's pilot project. He also connected with Michael Gough, an innovator in 3D and Web design, who became a Quokka vp and its creative director.

Blurred boundaries

The goal of total sports immersion is to move viewers up the “intensity curve” from being readers or viewers to being participants — hold your skepticism for just one moment — or even competitors. Quokka uses clever mixes of data feeds, technologies and presentation, including live video, to get observers in close to the action so they can see the events through the participants’ eyes. They use data from cameras, sensors and laptops. Of course, all of this can’t be the same as being on the America’s Cup crew, feeling the salt spray in your face and the start of motion sickness, but compared to TV....

To push visitors further up the intensity curve, Quokka runs virtual races parallel to the real one. The Whitbread site has averaged 90,000 visits per day. Over 6000 of those visitors have entered a virtual boat with the same performance characteristics as those in the race. The vicarious sailors get the same weather information as the racers and make decisions about steering. The real and virtual races overlap. Ramadan believes that as visitors have more intense experiences, he can charge them more, too.

Beep... beep...

Not all sports are candidates for Quokka’s treatment today. Boat and car races are ideal, because the tracking and telemetry equipment needs to be mounted on something that can handle its weight and mass. That won’t be true for long. The MIT Media Lab and GPS pioneer Trimble Navigation are working on much smaller items. For example, in the last Boston Marathon, one runner swallowed a pill that transmitted his vital body statistics. Eventually, the monitoring gear might be embedded in shoes or other sports equipment.

It’s easy to imagine information-rich events. In car racing, the broadcast producer today gets to choose whose car you track on TV. Why not be able to follow anyone in the pack? Auto races today already send amazing amounts of data to the pit crew. Why not make the 112 variables coming off the McLaren racecar (rpm, amount of fuel left, torque on back wheels and more) visible to the audience? (For a small, useful dose of how compelling real-time data can be, head for www.thetrip.com next time someone you know is on a commercial flight. Enter your visitor’s flight number, and you can track it across country, watching its altitude, airspeed and estimated time of arrival change as a map shows a small airplane crawl across the landscape.)

Ramadan sees Quokka as a digital sports media company, not merely a sports cybercasting Website. The company is acquiring rights to events and covering them. It’s beginning to create vertical online communities and cross-promote like mad, and it’s investigating product placement and other embed-ded sponsorship opportunities. Revenues from Whitbread were over $5 million from sponsors, advertisers and merchandising. Current sponsors include Compaq’s Tandem, which powers the online coverage; CNN SI (Sports Illus-trat-ed); Pandesic; and AOL’s CompuServe, which hosts the forum area and handles Quokka’s global connectivity.

SERVICEWARE: ANSWER CENTRAL

ServiceWare, Inc. has carved a comfortable and relatively stable spot for itself in the middle of a highly competitive and turbulent market. The company provides specialized content to other technology companies. Its specialty is all that arcane stuff you have to know to troubleshoot your PC's connection to your LAN or an application's allergic reaction to other software on your PC. When you use PC and online help systems from Cyber-media, Network Associates (formerly McAfee Associates), Quarterdeck and others, you're working with ServiceWare's content.

It turns out that many of the companies in the help-desk and tech-support business are tool or service providers, not content generators. When cust-omer call volumes started rising and problem complexity rose, many technology vendors came to ServiceWare to help them manage the content. The company licenses the enhanced content back to those vendors and to other compan-ies that need access to the same stuff.

ServiceWare also sells access to its data to help-desk service providers in a variety of formats. Until June 1996, its license fee averaged $2000 a desk, but ceo Jeff Pepper and his management team figured that at that price, they'd never conquer the world. So they cut prices 97 percent and signed up all the major customer-support software makers as OEMs. Now the fee is $100-$200 per seat.

Choosing topics

At ServiceWare's offices in Oakmont, PA, 50 editors sift through raw content and figure out what questions to answer. They choose topics based on call-flow information that support outsourcers and major vendors give them. Often they author content from scratch or take a solution and upgrade it to their standards.

One of ServiceWare's advantages is the way it moves information in and out of its system. Its editors deal in knowledge by-products such as trouble-ticket responses and hastily written FAQ files. But FAQs are not knowledge bases. ServiceWare has created its own process and standards, including a meta constraint language, to help its editors express solutions in a clear and concise way.

The system also uses alternate descriptions to help standard search engines match a customer's problem with a knowledge base problem, even if they've expressed it differently. Finally, ServiceWare can publish the solution sets in a variety of formats, including some that work nicely with systems from Vantive, Remedy, Software Artistry and other major customer-care vendors.

Now ServiceWare is teaching some of its customers how to generate their own content with its new Knowledge-Pak Architect (KPA) software, which contains the technology that the company uses to create its own Knowledge-Paks. The software works with customer-support systems to let support reps automatically capture call-log information and place it in the KPA database, along with hypermedia annotations, audio and video clips, URLs and structured diagnostics. Once the information is enhanced, the company can publish the data back into its support environment for reuse on the corporate intranet or the public Website.

Although information clearinghouses are emerging and other companies are working on information-exchange standards (see **Release 1.0**, 10-97), the fact is that the amount of content is increasing dramatically. Companies with the discipline, process and technology to deal with it will do well.

SOFTWARE602: NET STARTER KIT

Small and medium-sized companies trying to get on the Web face too many choices and decisions. Sounds like a great business opportunity, and several companies have emerged to offer more-or-less turnkey server systems with e-mail, Web access and more. The problem is that many of these systems offer limited functionality or are too expensive for their prospective buyers.

Software602, a Czech company with US headquarters in Jacksonville, FL, has slowly and quietly developed an inexpensive software-only solution that is feature-rich and resource-savvy. One of its strengths is providing Web access and individual e-mail accounts for up to 50 workers using only one modem and one IP address.

The company's Net server suite, 602Pro Internet Server, provides a post office, Web server, firewall and encryption, as well as Web browser access. Each post office can support up to eight incoming lines, which can range from regular modems to ISDN, cable modems and T-3 connections.

The Internet Server's complementary product, 602Pro Office Server, provides each user with e-mail, fax, voicemail and encrypted data to a single inbox. Other Software602 products include 602Web Forum, a threaded discussion system, and 602Web Publisher, an intranet office-document publishing system.

The company started in 1989 as a young people's computer club in Czechoslovakia. The government assigned it the registration number 602, which stuck through the major political changes and the club's shift to a private business. Its first product was the Czech Republic's best-selling DOS word processor, Text602. The US division's president, Premysl Pech, joined the company in 1993, when he founded its Slovak subsidiary. The company is profit-able and funds operations from sales and is publicly traded on NASDAQ.

UPSHOT: DEALS ON THE SCREEN
Debutant

All too often, sales automation software offers only contact management, autodialing and automated correspondence. Seldom does it help sales people act like a unified force, and all too often it sends them into the field poorly armed. UpShot's Web-based sales application is designed to remedy this situation.

The system integrates the sales-planning and -tracking information that managers want with the detailed contact and activity information that sales people need, presenting it all in a series of clearly designed, dynamically generated Web pages. In order to keep the system simple, the user stays inside a single browser window (many single-user sales tools litter the screen with enough windows to confuse most users).

UpShot's system makes liberal use of links and drop-down boxes with details in order to make the user's experience smooth and rich at the same time. A "What's Up" page collects all new and changed deals, account activities, to-do items and news flashes.

Up periscope!

The sales-prospecting Radar Screen, which shows upcoming deals on a round radar-like display, is the system's flashiest element. Users can choose from several different views, but typically circles on the display represent deal size and their proximity to the center indicates how close deals are to closing. When you see the radar display, you can hardly help imagining a time-lapse radar image of the sales process, with circles converging toward the center at different rates, some disappearing as deals blow up and others disappearing as they make it to the center and close.

A marketing effectiveness report condenses information that is usually hard for sales managers to derive and presents it uniformly. A communication wizard makes it simple for sales people to send e-mail or letters to multiple contacts at one time; telephony support makes it possible to dial numbers automatically. The system also has a cafÿ area where everyone authorized can post notes via the Net.

The system is priced at $500 per connected user or $700 per disconnected user. The version for disconnected use includes a local Personal Web Server, which allows sales people to work when they're off the Net and synchronizes data with the central server when they reconnect.

So far, UpShot has raised $9.6 million from Advanced Technology Ventures, Worldview Technology Partners, Asset Management Associates, TTC Ventures and Glynn Capital Management.

Before founding UpShot, president and ceo Keith Raffel spent seven years at Echelon, a developer of control networks for homes, factories and other places where standard LAN technology isn't appropriate or cost-effective (see **Release 1.0**, 12-90). Prior to Echelon, he was with Rolm. Now he's using his own product to sell itself. There's no better way to get your change requests to the top of the developers' list.

VISUAL INSIGHTS: TAMING BIG DATASETS

Bell Labs is one of the crown jewels that Lucent got when it split off from AT&T. For years, researchers in the Labs have been exploring the use of visualization technology to analyze large datasets. Now that research has hit the market in a Lucent venture named Visual Insights.

The software tool's first use was in the visualization of large-scale software-development projects. To develop and enhance its 5ESS switches, for example, Lucent had as many as 5000 programmers working on multi-million lines of source code over a period of 20 years. They used data visualization to manage the development and help developers understand the complex system more quickly and design new features as the system evolved.

No physical models

Under Steve Eick, now the cto of Visual Insights, the visualization team studied human perception and invented ways to make non-visual data visible. Most visualization products up to that time were rooted in scientific visualization, where the underlying information has a natural physical representation, such as oil deposits, weather, stresses on a beam or flow through a pipe.

Eick's team wanted to be able to analyze abstract data elements for patterns too complex to show up in tables. Over time, they developed a few dozen techniques, including Data Constellations, Event Trails and the Parabox (designed to solve problems involving associations, time-stamped data and relationships among multiple variables, respectively). All these tools are linked to help users query their data visually, select subsets and run further analyses easily.

The system is versatile and amazingly quick, especially given the size of the datasets it often tackles. (It now runs as a set of ActiveX components on standard Pentium PCs running Windows 95 or NT.) It is intended to augment its users' abilities, relying on the human eye and brain to do what they do so well: detect patterns.

Some examples

Jim Weichel, one of Visual Insights' founders, demonstrated his system's usefulness with two compelling examples: Year 2000 code analysis and 5ESS (switch) system troubleshooting.

The Y2K application can process large code libraries, show their major subgroups and then highlight the areas where there appears to be greater risk of code that could need remediation. If you drill down to a program group, the system can find instances of questionable code across the whole group. Many procedural programs are just variants of one another. Visual Insights makes it easy for the user to detect those patterns and makes them easy to edit in unison.

The switch-troubleshooting application shows high-volume data collected from large numbers of processors or ports at frequent intervals. By looking at the overall pattern of the data, zooming in and out, drilling into the data and changing some of the presentation parameters, an analyst can find out that a processor, particular port or system function is performing poorly at a given hour each day, for example, and go about figuring out why.

Visual Insights' next target domain is analyzing customer buying patterns, especially business problems like customer retention. The development team is also working on network management. Clients can buy components that they can build into their own products or complete applications targeted at particular problems, so system pricing can range from $20,000 to several million dollars.

Spinning free

The technology has been in internal use for five years within Lucent. It has been sold outside the Labs for two years. For example, AT&T bought it to detect long-distance fraud.

The company's official launch was last December. It now has 50 people. It sells direct to large corporations, as well as to OEMs such as IBM and Platinum, both of which it is already working closely with.

As Visual Insights was being announced publicly, Lucent appointed Doug Cogswell as the venture's new ceo. Cogswell was previously president of Open Port Technology, which provides Internet and corporate fax messaging software. Prior to Open Port, he was president of Palindrome, now a division of Seagate Technology that focused on client-server storage management.

XACCT: KNOW WHAT HAPPENED

Most corporations have systems that help them account for phone usage or data-processing costs. With these systems, departments allocate pennies worth of hard-disk storage to projects and charge each others' budgets in a battle for ROI supremacy. However, when it comes to figuring out how to slice and dice all the money being spent on Internet technologies, they're stumped.

Twenty months ago, Eran Wagner and Limor Schweitzer founded XaCCT, which specializes in the auditing, accounting and billing of TCP/IP networks. By piecing together the elements of complete client/server sessions and treating them as single transactions, XaCCT's software can generate reports of IP usage similar to telephone reports.

XaCCT's system collects information from devices all over a company's net-work, including firewalls, routers, hubs, application servers, directory name servers and captured network packets. It stores and matches this information to put together a complete picture of the transactions. In its upcoming software version (3.0), due imminently, XaCCT will shift from log analysis to the placement of strategically located software agents it calls Gatherers around the network. This will allow it to collect better information, more quickly.

The company is privately held; its venture funding is from Ampal, Elrov Technologies and Israel Seed Partners.

THE PC FORUM NETWORK

This year, IBM has again graciously provided computers for the Forum net-work, but with a special twist: These are IBM's version of the network computer, the Network Station. With their Java runtime environments, they are fully capable for Web browsing and other Net applications.

For the third year in a row, Tektronix is providing color printers and signage, and for the fourth year running, ANS (which used to be AOL's, but is now part of WorldCom) brings us the T-1 connection to the Net. We thank them all for their continued support.

Colorado Micro Displays: Surf and stroll

We have invited one company to have a special "show and tell" role on Monday and Tuesday afternoons, because the technology is best understood by trying

it on. The company, Colorado MicroDisplay (CMD), makes color displays small and light enough (about two ounces) to be mounted on the frame of a pair of eyeglasses. The display is in an eyepiece that sits an inch or so in front of either of the user's eyes.

When you look into the eyepiece, you see a bright, full-color, SVGA-quality (800 x 600) screen. Its apparent size is that of a 15-inch monitor at a normal viewing distance. The eyepiece is connected by cable to a device the size of a set-top box that will shrink to the size of a PCMCIA card later this year.

Then it will be easy to slip the card into any laptop, ignore or turn off the normal display, and work without worrying that the person in the seat ahead will tilt her chair back any time soon and in complete privacy (think of that next time you review a contract on the plane on your laptop's bright, crisp display). CMD's display should also consume considerably less power than a normal-sized flat-panel display.

Besides being an after-market add-on to PCs, CMD's displays may also be the primary display of new devices that could be physically small, but able to give users a large, full-color image. For example, a cellular phone might come equipped with such a display for viewing faxes, e-mail or Web pages.

Sybase founder and evp Bob Epstein is CMD's chairman of the board, as well as one of its funders and founders. The company's ceo is Mark Willner, who has played key sales and marketing roles at multiple high-tech startups over the past 20 years, including Britton-Lee, Metaphor and Plexus. Doug McKnight, who invented the technology, is the company's chief scientist.

THE KIDS' ROOM

After many years of wishful thinking, this year we have finally arranged a room where kids can go to try out a variety of technologies designed specifically for them. The room will be open all afternoon on Monday and Tuesday, and features four projects of different types and for different age groups. One of them is Purple Moon's software, described above (see page 36). Here are the other three.

Stagecast and Cocoa

Allen Cypher has worked for years on programming by demonstration. In his view, "If you know how to do something yourself, that should be enough. You should be able to turn on a recorder, do what you want to do, and play it over." As a researcher in Apple's Advanced Technology Group, he created a prototype system called Eager that tracks what a user does, looks for repetitive patterns, then offers to automate them; sort of a reverse scripting tool.

More recently, working with David Smith in the Research Group, Cypher created a program called KidSim that evolved into Cocoa.. Here's how it works.

The stage is a simple grid. The cast is made up of often cartoon-like characters. They behave according to rules made of tests and actions. To teach a character a rule, you set up a situation on the stage in which

that rule should apply, and then demonstrate what should happen in that situation by actually doing it using direct manipulation.

Say you have created two kinds of fish, big and small, each with two appearances, facing right and facing left. Place a big fish facing right on the stage with space in front of it to swim. Start recording, drag the fish one square to the right and stop recording. Now all big fish facing right know how to swim right into empty space.

Next, place a wall in front of the big fish facing right. Start recording, select the “facing left” appearance for the fish and stop recording. Create an analogous rule for the big fish facing left. Now all big fish know how to change direction when they encounter a wall. Finally, place a small fish in front of the big fish facing right. Start recording, vacuum (delete) the small fish, drag the big fish into the square just vacated by the small fish and select an eating sound. Do the same with a big fish facing left. Now all big fish know to eat small fish.

Make it so

Younger kids work only with pictures. Older kids can add variables whose values are numbers or simple strings. Rules can be conditioned on other objects in the vicinity, on the values of variables or on user actions such as typing or clicking. You can also add your own primitives and so on, but there is a lot to do without getting too complex. With this simple idea and some simple rules, you can do many things.

For instance, it’s pretty easy to mock up a game of Pac-Man or Pong. The next release of Cocoa will be powerful enough to let kids make their own living books. Someone has already used Cocoa to make a Tamagotchi. Cocoa was designed for kids age 10 and up, but it is used by kids down to 6 or so. Unlike most other programming tools, girls and boys take to it with equal interest.

Make it cross-platform

Last March, Apple canceled the Cocoa project during a downsizing, when the team had just released a Mac version to the Web and was a few months short of finishing an alpha Java version. The team was laid off. The team founded Stagecast, negotiated a license with Apple and recruited Larry Tesler, Apple’s chief scientist, to head the company. The license was announced in October.

About half the original development team came to the startup, which has just finished its first round of financing with IDG Ventures and a few angels, including Esther Dyson. Tesler expects to launch the company and its products officially this calendar year.

Right now, Stagecast has only one business model: software sales. It will distribute its software through the Web directly to individuals, or to schools indirectly through partners. Tesler wants customers at home and at school, because the two markets feed each other. He has no plans to go after retail shelf space, but he would like to develop other revenue streams.
Stagecast’s Cocoa-like authoring tool has not yet been named. It will

produce applets that can run in any of three ways: as a standalone application, published on a Web page or as source that others can modify using the same authoring tool. Authors will be able to restrict the degree to which users can modify source. These and other features may lead to other money-making opportunities.

MaMaMedia: Constructionism that rocks

Idit Harel was one of the first graduates of MIT's Media Lab, where she fell under the benign spell of learning theorist Seymour Papert. He is today an advisor to Harel's company, MaMaMedia.

Papert is the father of Constructionism, a theory of learning that favors putting kids into environments rich with stimuli and things to do, and letting them make things. By making things that work and things that don't, they build meaningful mental models of how things work that are difficult to generate through more traditional methods.

MaMaMedia uses Constructionist ideas in a fun way, offering kids tools, activities and projects that build learning skills on the Net. Kids can completely customize the interface, starting by creating a character for themselves (their "Digital Signature") from a selection of heads, torsos and legs. All their personal touches greet them whenever they return. The Noise Shop lets kids connect noises with on-screen objects and publish them to one another. They can add clip art and other stuff inside the site. Think of it as GeoCities meets Pee-Wee's Playhouse.

Kids' safety is extremely important to Harel. So is kids' freedom to surf in order to learn. Surfing activities like The Sandwich Shop let kids walk inside a highly visual directory of over 1400 hand-picked, kid-safe sites, collect their favorite Surf Picks and build their own directories. When kids and their parents register at the site, they are encouraged to learn about safety issues.

The MaMaMedia site is also commercial. It is regularly featured in AOL's Kids Only and Families channels. Banner ads run across the top of most of its pages; a small sign and arrow says they're ads. Harel is careful about the boundary between fun and marketing, even as she creates new revenue opportunities, such as special features that members might buy. Overall, MaMaMedia does a great job of creating a safe place in which kids can take charge of their own learning.

Night Kitchen: Bob Stein gets his wish

As the head of The Voyager Company, Bob Stein continually wished for tools that would let authors and artists assemble multimedia documents without programming. There was no other way, he reasoned, to create a critical mass of titles and develop a healthy market. Upon leaving Voyager, he set up Night Kitchen to build a new class of authoring tools. The company's first product, a tool called TK3, will be released this fall. Stein believes it will invigorate electronic publishing by giving voice to authors and artists to publish a broader range of titles at much lower costs.

With TK3, authors with only basic computer skills can create templates

that not only standardize an application or title's look and feel, they also create a distinctive look to affordances such as links, callouts, mouseover tips and so forth. Users "pour" text, images, video clips and sounds into the templates, and TK3 manages the resources properly so they can be published to CD-ROMs or Websites.

Teachers should be able to use TK3 to develop polished, engrossing course-ware. Of course, Stein hopes that creative people of all kinds will use TK3 to express themselves. As is true of every project Stein is part of, TK3 is elegant and aesthetically pleasing. Night Kitchen has five employees and received its first round of funding from the Markle Foundation.

RESOURCES & PHONE NUMBERS

Andy Sack, **abuzz**, (617) 499-0074 x102; asack@abuzz.com
Charles Morgan, **Acxiom**, (501) 336-1301; fax, (501) 336-3913; cdmorgan@acxiom.com
David Johnson, **Aspen Institute**, (202) 736-3850; fax, (202) 467-0790; david.johnson@counsel.com
Gautam Godhwani, **AtWeb**, (408) 774-4573; gautam@atweb.com
Steven Wallman, **Brookings Institute**, (703) 759-6518; fax, (703) 438-3918; wallman@wallman.com
Halsey Minor, **c|net**, (415) 395-7805; fax, (415) 395-9330; halsey@cnet.com
Steve Brill, **Content Magazine**, (212) 484-8250; fax, (212) 405-5108; sbrillnn@counsel.com
Ken Ross, **CrossRoute**, (415) 596-4545; fax, (415) 596-1310; kross@cross-route.com
Michael Dell, **Dell Computer**, (512) 728-1371; fax, (512) 728-8366; michaeldell@dell.com
Tim McDonald, **Digital Knowledge Assets**, (312) 640-0099; fax, (312) 640-0092; tim@dkaweb.com
Scott Ryan, **Elastic Networks** (Nortel), (770) 661-4772; fax, (770) 708-5885; smryan@nortel.com
Susan Ness, **Federal Communications Commission**, (202) 418-2100; fax, (202) 418-2821
Nick Grouf, **Firefly Network**, (617) 528-1000; fax, (617) 577-7220; nick_grouf@firefly.net
Jim Cashel, **Forum One Communications**, (415) 512-8856; fax, (415) 512-9409; cashel@forumone.com
Joy Pinsky, **FreeGate**, (408) 617-1000; fax, (408) 617-1010; jpinsky@free-gate.com
David Bohnett, **GeoCities**, (310) 314-8900; fax, (310) 664-6521; dbohnett@geocities.com
Sanjiv Sidhu, **i2 Technologies**, (214) 860-6000; fax, (214) 860-6700; sanjiv_sidhu@i2.com
Charles Palmer, **IBM Research**, (914) 784-7411; fax, (914) 784-7582; ccpalmer@us.ibm.com
Jeff Berg, **ICM**, (310) 550-4205; fax, (310) 550-4470; jberg@icmtalent.com
Craig Barrett, **Intel**, (602) 554-5977; fax, (602) 893-7755; crbar-ret@inside.intel.com
Scott Cook, **Intuit**, (650) 944-2721; fax, (650) 944-6999; scott_cook@intu-it.com
Nina McIntyre, **Invention Machine**, (617) 305-9250; nina_mcintyre@invention-machine.com
Ryo Koyama, **iReady**, (408) 325-8720; fax, (408) 325-8721; koyama@iready-co.com
Scott Heiferman, **i-traffic**, (212) 219-0050; fax, (212) 219-3434; .....scott@i-traffic.com
Tom Evslin, **ITXC**, (732) 940-4333 x120; fax, (732) 940-4334; tevslin@itxc.com
Rakesh Mathur, **Junglee**, (408) 522-9471; fax, (408) 522-9470; rakesh@jun-glee.com
Mark Gainey, **Kana Communications**, (650) 812-0406; fax, (650) 812-0407; mark@kana.com
Juan Moran Adarraga, **Meta4**, +34 (1) 634-8634; fax, +34 (1) 634-8666; juanm@meta4.es

Sefi Vigiser, **Mirabilis**, +972 (3) 648-8090; fax, +972 (3) 648-8095; sefi@mirabilis.com
Yossi Vardi, **Mirabilis**, +972 (3) 641-7831; fax, +972 (3) 641-8565; vardi@ibm.net
Sverker Lindbo, **Mirror Image**, +46 (8) 506-255 00; fax, +46 (8) 506-255 01; sverker@mirror-image.com
Donald Block, **Natrificial**, (310) 656-8494; fax, (310) 656-8488; dblock@natrificial.com
Harlan Hugh, **Natrificial**, (310) 656-8494; fax, (310) 656-8488; hhugh@natrificial.com
Jim Barksdale, **Netscape**, (650) 937-2918; fax, (650) 526-4126; jimb@netscape.com
Carlos Mendez, **OpCom**, (206) 284-7387; fax, (206) 284-7387; opcom@seanet.com
Warren Adams, **PlanetAll**, (617) 661-3995 x23; fax, (617) 354-7325; adamsww@planetall.com
R. C. Venkatraman, **PostX**, (408) 871-3500 x19; fax, (408) 871-3539; venkat@postx.com
Brenda Laurel, **Purple Moon**, (650) 526-5000; fax, (650) 526-5001; laurel@purple-moon.com
Alan Ramadan, **Quokka Sports**, (415) 977-2330; fax, (415) 908-1841; alan.ramadan@quokka.com
Jeff Levy, **Relevant Knowledge**, (404) 224-3301; fax, (404) 224-2110; jeff@rkinc.com
Jeff Pepper, **ServiceWare**, (412) 826-1158 x20; fax, (412) 826-0577; pepper@serviceware.com
Premysl Pech, **Software602**, (904) 356-6020; fax, (904) 353-2602; premysl@software602.com
Roy Pea, **SRI International**, (650) 326-6200; roypea@unix.sri.com
Stewart Baker, **Steptoe & Johnson**, (202) 429-6413; fax, (202) 429-3902; sbaker@steptoe.com
Charles Sirois, **Telesystem**, (514) 868-7777; fax, (514) 868-7529; csirois@teleglobe.ca
John Holland, **University of Michigan**, (734) 663-0226; jholland@umich.edu
Stephanie Forrest, **University of New Mexico**, (505) 277-7104; fax, ... (505) 277-6927; forrest@cs.unm.edu
Kris Olson, **UpShot**, (650) 482-3739; fax, (650) 482-3737; kris@upshot.com
Larry Summers, **US Department of the Treasury**, (202) 622-1080; fax, (202) 622-0081; shirley.gathers@treas.sprint.com
Stratton Sclavos, **VeriSign**, (650) 429-3462; fax, (650) 961-8853; stratton@verisign.com
Jim Weichel, **Visual Insights** (Bell Labs), (630) 979-4777; fax, (630) .....979-5894; jweichel@lucent.com
John Sidgmore, **WorldCom**, (703) 206-5600; fax, (703) 206-5805; sidgmore@uu.net
Eran Wagner, **XaCCT**, +972 (3) 618-1118; fax, +972 (3) 579-9798; wags@xacct.com

COMING SOON

- What advertisers measure.
- Online governance.
- Market-based security.
- And much more... (If you know of any good examples of the categories listed above, please let us know.)

———————-

Release 1.0 is published monthly, except for a combined July/August issue, by EDventure Holdings, 104 Fifth Ave., New York, NY 10011-6901; (212) 924-8800; fax, (212) 924-0240; http://www.edventure.com. It covers software, the Internet, electronic commerce, computer-telephone integration, online services, group-ware, text management, con-nec-tivity, messaging, wireless communications, intel-lect-ual property law and other unpredictable topics. Editor: Esther Dyson (edyson@edventure.com); pub-lisher: Daphne Kis (daphne@ edventure.com); managing editor: Jerry Michalski (spiff@edven-ture.com); office manager: Helen Martin (helen@ed-ven-ture.com); marketing manager: Mari Katsunuma (mari@edventure.com); cir-cu-la-tion mana-ger: Scott Giering (scott@ edventure.com); assistant: Trista Schroeder (trista@ed-ven-ture.com); receptionist: Philena Taylor (philena@edventure.com). *Copy—-right 1998, ED-ven-ture H—oldings Inc. All rights re-served. No mater-ial in this pub-li-cation may be re-pro-duc-ed with-out written permission; however, we gladly arrange for re-prints or bulk purchas-es.* *Subscriptions cost $695 per year, $750 over-seas.*

RELEASE 1.0

SUBSCRIPTION FORM

Please enter my subscription to Release 1.0 at the rate of $795 per year in the U.S. and Canada. Overseas subscriptions are $850, airmail postage included. Payment must be enclosed. Satisfaction guaranteed or your money back.

Name _____

Tite _____

Company _____

Address _____

City _____ State _____ Zip _____

Country _____

Telephone _____ Fax _____

E-mail _____ URL _____

☐ Check enclosed

☐ Charge my

☐ American Express ☐ Master Card ☐ Visa

Card Number _____ Expiration Date _____

Name and Billing Address _____

Signature _____

☐ Please send me information on your multiple copy rate.

Please fill in the information above and send to:

EDventure Holdings Inc.
104 Fifth Avenue, 20th Floor
New York, NY 10011

If you have any questions, please contact us at 1 (212) 924-8800;
fax 1 (212) 924-0240; e-mail us@edventure.com; www.edventure.com.

Daphne Kis
Publisher

3-98